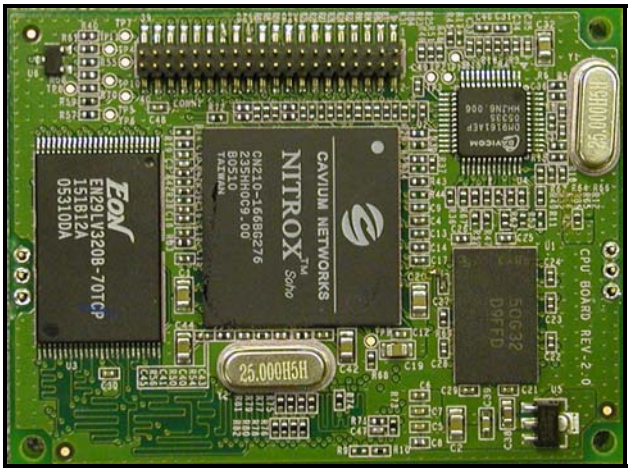
SX-550 WLAN Module



Developer's Reference Guide

Part Number 40183-101
Revision D

© 2006 silex technology america, Inc.. All rights reserved.
January, 2006

silex technology america SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF THIS PRODUCT FOR A PARTICULAR PURPOSE. silex shall not be liable for any errors contained in this manual or for any damages resulting from loss of use, data, profits, or any incidental or consequential damages arising from the use of SILEX products or services. The information contained in this documentation is subject to change without notice.

Information and descriptions contained herein are the property of silex. Such information and descriptions may not be copied, disseminated, or distributed without the express written consent of silex. This publication is subject to change without notice.

The software embedded in this SX-550 module includes eCos, the Embedded Configurable Operating System. eCos is licensed under a GNU GPL compatible Free Software License. In compliance with the eCos license, the silex is offering the eCos source code for this product on our web site at http://www.silexamerica.com. A copy of the eCos and GNU General Public License are available in the license folder on the CDROM that ships with this product.

Trademarks

ExtendView is a trademark of silex technology america, Inc. All other company or product names referenced in this document may be trademarks or registered trademarks of their respective owners.

silex technology america, Inc.

www.silexamerica.com

Part Number 40183-101

Contents

About This Reference Guide 1
Safety Precautions 1
Emissions Disclaimer 1
Chapter 1: Introduction 3
Chapter 2: Getting Started 5
Verify Development Kit Contents 6
Installing the SX-550 WLAN Module 7
Chapter 3: SX-550 Evaluation Daughtercard Hardware Configuration 9
Monitoring Module Status 9
OEM Interface 10
Electrical Characteristics 12
Power Input 12
Power Management 12
Serial Peripheral Interface 12
Serial Ports 13
General Purpose IO 15
LEDs and General Purpose IO Signals 16
RS-232 Cable 17
Additional OEM Interface Signals 17
OEM Interface Electrical Characteristics 18
Chapter 4: Using the SX-550 WLAN Module 19
Evaluation Module Connections 19
Using the Wireless Method 19
Using the Wired Ethernet Method 20
Access silex Console Interface 20
Generating Configuration Data 21
Chapter 5: Accessing Configuration Parameters 23
Access ExtendView Utility 23
Installing ExtendView Utility 24
Using ExtendView Utility 25
Access HTTP Pages 27
Access Internal Command Console 28
Using Telnet Session 29
Using Terminal Emulator through the Serial Port 29
Using AT Modem Commands 30
Standard AT Commands Supported 30
Response Codes 32

Chapter 6: Setting Configuration Parameters 33
Factory Default Settings 33
Restoring Factory Default Settings 34
Modify Basic Settings 34
Changing Serial Settings 34
Modifying TCP/IP Settings 36
Configure Simple Network Management Protocol 39
Configuring GPIO Alerts and Traps 40
Configuring Serial Port Monitor Alert and Trap Configuration 44
Chapter 7: Designing with the SX-550 46
OEM Header Interface 46
Antenna Connectors 48
Ethernet PHY 49
Transformer Specification 49
General Purpose I/O Interface 50
Power 51
Chapter 8: Product Specifications 52
TCP Port Connections 55
Appendix A: Console Commands 56
Wireless and Network Security Commands 56
Port Commands 62
Server Information Commands 63
Service Commands 65
String Commands 67
TCP/IP Commands 68
Power Configuration Commands 71
Firmware Update 71
Miscellaneous Commands 73
Help Commands 73
Appendix B: Engineering Drawings 74
Antenna Cable Assembly 74

Figures

Figure 1 Processor and Wireless LAN Radio PCB 3
Figure 2 Installing WLAN Module in Daughtercard 5
Figure 3 WLAN Module Inserted in Daughtercard 7
Figure 4 Antenna Connectors 7
Figure 5 SX-550 Evaluation Daughtercard 8
Figure 6 JP1 Header 12
Figure 7 Optional Serial Signals 13
Figure 8 Serial Port DB-9 Connector 14
Figure 9 RS-232 Cable Pinouts 17
Figure 10 ExtendView Main Page 25
Figure 11 ExtendView New View Window 25
Figure 12 Create View with Default Settings 26
Figure 13 ExtendView Window 26
Figure 14 ExtendView Configuration Window 27
Figure 15 SX-550 Home Page 28
Figure 16 Output Port Tab 34
Figure 17 Serial Settings Window 35
Figure 18 TCP/IP Window 36
Figure 19 Change Password Window 37
Figure 20 Advanced TCP/IP Configuration Window 38
Figure 21 SNMP Traps 40
Figure 22 Main and Auxiliary Antenna Connectors 48
Figure 23 Circuit Diagram with Transformer 49
Figure 24 Antenna Cable Assembly 74
Figure 25 Electrical Specifications for Antenna 75
Figure 26 Connector Specifications 75

Tables

Table 1 Development Kit Contents 6
Table 2 Status Monitors 9
Table 3 OEM Interface Pinout 10
Table 4 OEM Interface Signal Description 11
Table 5 Logical Serial Port Signal Descriptions 13
Table 6 DB-9 Pinouts for RS-232 Mode 14
Table 7 General Purpose IO Signal Descriptions 15
Table 8 General Purpose I/O Signal Description 15
Table 9 LED and GPIO Descriptions 16
Table 10 RS-232 Cable Pinout Description 17
Table 11 OEM Signal Parameter Descriptions 18
Table 12 Port Settings 20
Table 13 Pushbutton Functions 21
Table 14 ExtendView System Requirements 24
Table 15 Port Settings 30
Table 16 AT Commands 31
Table 17 Extended AT Commands 32
Table 18 Response Codes 32
Table 19 Factory Default Settings 33
Table 20 Serial Setting Parameters 35
Table 21 TCP/IP Settings 37
Table 22 TCP/IP Configuration Settings 38
Table 23 SNMP Commands 39
Table 24 SNMP Trap Settings 40

Table 25 GPIO Commands 41
Table 26 GPIO Trigger Commands 42
Table 27 GPIO Transmit Commands 43
Table 28 Port Monitor Alert Commands 44
Table 29 TRIGMON Commands 45
Table 30 OEM Header Interface Pinout 46
Table 31 OEM Interface Signal Description 47
Table 32 Antenna Connector Types 48
Table 33 10/100M Magnetic Specifications 49
Table 34 10/100M Magnetics Manufacturers 50
Table 35 GPIO Interface 50
Table 36 Product Specifications 52
Table 37 Radio Performance Specifications 52
Table 38 TCP Port Connections 55
Table 39 Network Commands 56
Table 40 Port Commands 62
Table 41 Server Information Commands 63
Table 42 Service Commands 65
Table 43 String Commands 67
Table 44 TCP/IP Commands 68
Table 45 Power Configuration 71
Table 46 Firmware Update 71
Table 47 Miscellaneous Commands 73
Table 48 Electrical Performance 74
Table 49 Electrical Specifications 76

About This Reference Guide

This reference guide provides detailed specifications, diagrams and additional information required to integrate the Ethernet and Wireless Serial Server Module in a product. The intended audiences are the developers and engineers responsible for the integration of the module in another product.

Safety Precautions

- To prevent damage to the SX-550 module's electronic circuit components, follow established ESD practices and procedures for handling static-sensitive devices. All ESD-sensitive components must be stored and shipped in ESD-conductive bags or bubble-wrap and labeled as such using the standardized ESD adhesive warning label.
- Ethernet electrical wiring must be at least 6 feet from bare power wiring or lightning rods and associated wires, and at least 6 inches from other types of wire (antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating devices.
- Protectors and grounding wire placed by the service provider must not be connected to, removed, or modified by the customer.

Emissions Disclaimer

Final emission certification per FCC, CE and other agency requirements are the responsibility of the OEM using any printed circuit assemblies or other items used in this developer's kit in their saleable packaged product.

Chapter 1: Introduction

The SX-550 WLAN Module provides a complete solution for integrating networking technology into a product. It includes an embedded processor, auto-sensing 10baseT/100baseTX Ethernet MAC/PHY, wireless chipset and embedded operating system with a full networking stack and drivers. The wireless high speed network interface conforms to the IEEE 802.11a, b, g, and h protocols. The radio is based on Conexant's PRISM WorldRadio chipset.

The module consists of two printed circuit boards measuring 44.60 mm by 59.70 mm. One card contains the processor and memory and the second card contains the 802.11abg wireless LAN radio, as shown in Figure 1. In addition, the module supports dual diversity antennas and intelligent power control.

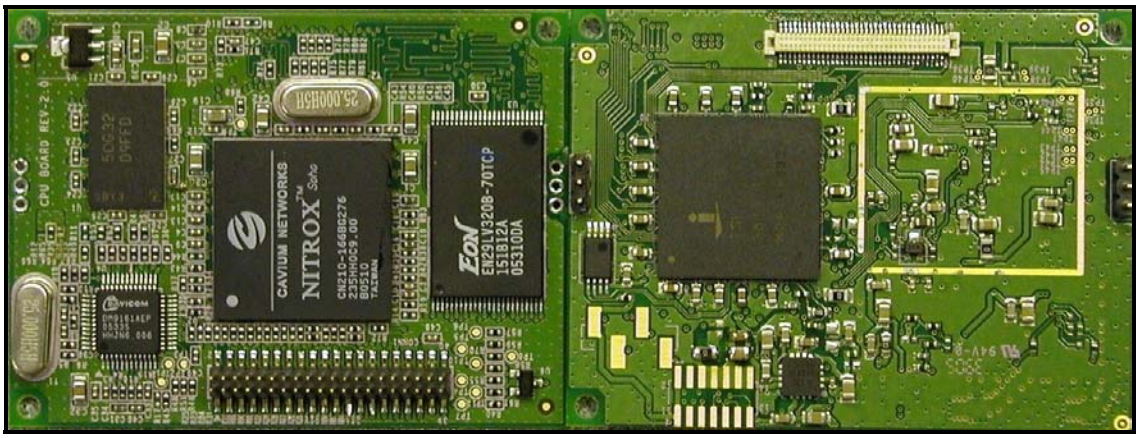


Figure 1 Processor and Wireless LAN Radio PCB

Chapter 2:
Getting Started

You can install the SX-550 WLAN Module in the SX-550 Evaluation Daughtercard and connect the cabling, as shown in Figure 2.

Figure 2 Installing WLAN Module in Daughtercard

Verify Development Kit Contents

The SX-550 Evaluation Module Development Kit CAS-1000-I2C product consists of the components listed in Table 1. Please ensure that all materials listed are present and free from visible damage or defects before proceeding. If anything appears to be missing or damaged, please contact SILEX.

Table 1 Development Kit Contents

Description
SX-550 Evaluation Daughtercard
2x Antennas with 4-inch Cables
2 x Magnetic Stand with 3-foot Cables
5 VDC 1 Amp Power Supply
AC Power Cord for US
AC Power Cord for Europe
2 x Serial Null Modem Cables with Gender Changer
Plastic bag containing: ▪ 4 x Rubber Feet with Adhesive ▪ 3 M2 screws ▪ 3 M2 nuts ▪ 3 — 3mm nylon spacers ▪ 3 — 8mm nylon spacers
CD containing:
▪ ExtendView Software
▪ Serial Port Emulator
▪ This User's Guide

Installing the SX-550 WLAN Module

To install the SX-550 WLAN module in the SX-550 Evaluation Daughtercard:

1. Using the 40-pin OEM header, plug the SX-550 WLAN Module in the SX-550 Evaluation Daughtercard and secure with screws, nuts and spacers.

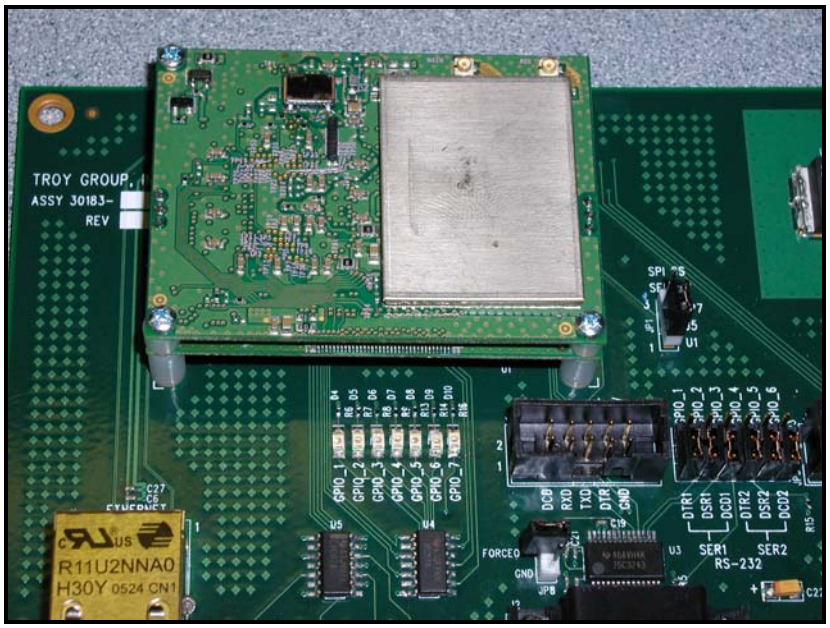


Figure 3 WLAN Module Inserted in Daughtercard

2. Plug the main antenna cable into the right top corner Main Antenna Connector on the card. If needed, plug the auxiliary antenna cable into the Auxiliary Antenna Connector.

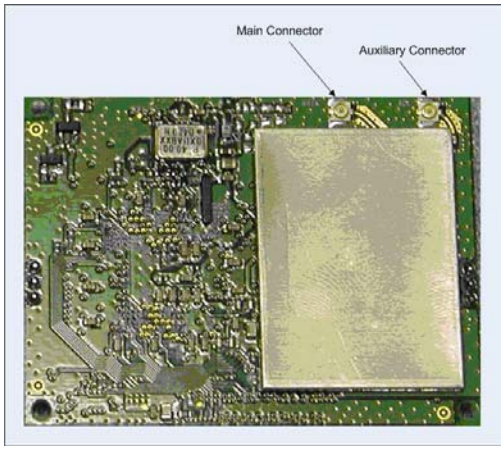


Figure 4 Antenna Connectors

3. Connect the magnetic antenna base cable to the antenna cable.
4. Connect the antenna to the base.
5. Connect one serial null-modem cable from the Serial Port 2 DB-9 connector on the evaluation daughtercard to a serial port on a personal computer or laptop. The PC or laptop acts as a console port for command line configuration and monitoring.
6. If an Ethernet LAN connection is required, plug a category 5 Ethernet cable into the RJ-45 jack.

   The Ethernet interface has Auto-MDIX that automatically detects and configures itself for either a straight-thru or crossover Ethernet cable.

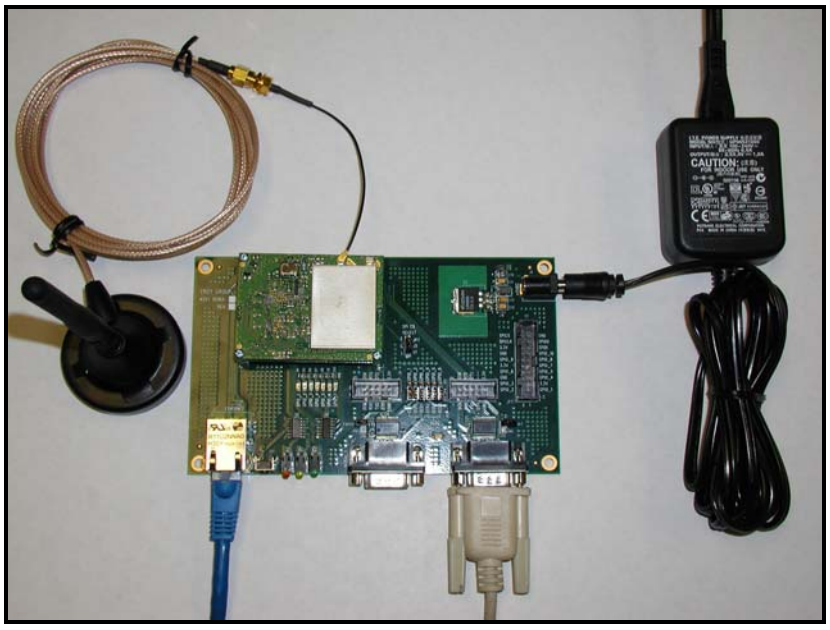


Figure 5 SX-550 Evaluation Daughtercard

Chapter 3:
SX-550 Evaluation Daughtercard Hardware Configuration

Monitoring Module Status

You can monitor the module status using the yellow, green and orange LED status indicators on the monitor. Table 2 defines the default functions of the LED status indicators.

Table 2 Status Monitors

Function	State	Status
Power Orange	On	The module is receiving power
	Off	The module is not receiving power
	Blinking	The module power supply is malfunctioning
Network Status Yellow or Green	Yellow Off Green Off	No network activity
	Yellow On Green Off	10baseT network active
	Yellow Blinking Green Off	10baseT network data received
	Yellow Off Green On	100baseTX network active
	Yellow Off Green Blinking	100baseTX network data received
	Yellow On Green On	Wireless network active, if wireless model

Function	State	Status
	Yellow Blinking Green Blinking	Wireless network data received, if wireless model

OEM Interface

Table 3 describes the OEM interface pinout, J5, for the SX-550 Evaluation Daughtercard. Table 4 describes the OEM interface signal descriptions.

All input and output signals, except the differential signals, are 0 to 3.3 V logic signals.

Table 3 OEM Interface Pinout

Pin	Signal	Pin	Signal
1	TPRX+	2	TPTX+
3	TPRX-	4	TPTX-
5	GPIO_7	6	GPIO_8
7	AVDD	8	+3.3VDD
9	UART0_RXD	10	GPIO_9
11	UART0_TXD	12	GPIO_10
13	GND	14	+3.3VDC
15	UART0_RTS	16	UART0_CTS
17	UART1_RTS	18	UART1_CTS
19	GND	20	GND
21	UART1_TXD	22	UART1_RXD
23	GND	24	RESET_N
25	SPI_CS	26	SPI_CLK
27	+3.3VDC	28	GND
29	GPIO_1	30	SPI_SDO
31	GPIO_2	32	SPI_SDI
33	+3.3VDC	34	GND
35	GPIO_3	36	GPIO_4
37	GND	38	GND
39	GPIO_5	40	GPIO_6

Table 4 OEM Interface Signal Description

Signal	Pin	Type	Description
TPRX+, TPRX-	1,3	Differential output	Ethernet Transmit Data primary
TPTX+, TPTX-	2,4	Differential input	Ethernet Receive Data primary
AVDD	7	Power	Ethernet Power Output to transformer center tap
UART0_RXD	9	Input	Serial Port 1 Receive Data
UART0_TXD	10	Output	Serial Port 1 Transmit Data
UART0_RTS	15	Output	Serial Port 1 Request To Send
UART0_CTS	16	Input	Serial Port 1 Clear to Send
UART1_RXD	22	Input	Serial Port 2 Receive Data
UART1_TXD	21	Output	Serial Port 2 Transmit Data
UART1_RTS	17	Output	Serial Port 2 Request To Send
UART1_CTS	18	Input	Serial Port 2 Clear to Send
GPIO1, GPIO2, GPIO3, GPIO4, GPIO5, GPIO6, GPIO7, GPIO8, GPIO9, GPIO10	29, 31, 35, 36, 39, 40, 5, 6, 10, 12	Input/Output	General Purpose Input/Output Signals 1-10, User defined
SPI_CS	25	Output	Serial Peripheral Interface Chip Select (high-true)
SPI_SDO	30	Output	Serial Peripheral Interface Data Out
SPI_SDI	32	Input	Serial Peripheral Interface Data In
SPI_CLK	26	Output	Serial Peripheral Interface Clock
RESET_N	24	Output	Power-on Reset (low true)
+3.3VDC	8, 14, 27, 33	Power	Power VCC Input
GND	13, 19, 20, 23, 28, 34, 37, 38	Power	Power Ground

Electrical Characteristics

The power requirements, port pinouts, GPIO characteristics, cable connections and wireless operational modes are described below.

Power Input

Power to the SX-550 WLAN Module and Evaluation Daughtercard is supplied through the power jack, located at J4, at +5VDC ±10%. Use a +5VDC power supply with a minimum of 1 amp capacity.

Power of +3.3VDC ±5% is input to the SX-550 WLAN Module via the OEM header, J5.

Power Management

Power for the SX-550 WLAN Module is less than 3 watts in normal power mode and peak consumption is less that 3.3 watts. In low power mode average power is 1.2 watts.

Serial Peripheral Interface

The four SPI signals are accessible using the 20-pin header JP7. The Data Out, Data In and Clock signals are routed to both the JP7 header and an on-board temperature sensor. The SPI Chip Select signal is selectable to either the JP7 header or to the temperature sensor using the 3-pin header JP1.

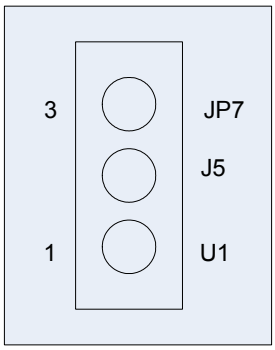


Figure 6 JP1 Header

Routing the SPI Chip Select Signal

To select the on-board temperature sensor, place the jumper on pins 1 and 2.

To route the Chip Select signal to JP7, place the jumper on pins 2 and 3.

Serial Ports

The two serial ports can be accessed with RS-232 signals, via the DB-9 connectors, or logic signals, via the 10-pin headers.

The two logical serial port headers are located at JP2 and JP6. The serial ports provide four dedicated signals and three optional signals. The optional signals are configured using jumpers. Table 5 details the serial port signal descriptions.

Table 5 Logical Serial Port Signal Descriptions

Pin	Signal	Input/Output	Pin	Signal	Input/Output
1	DCD	Input Enabled via header	2	DSR	Input Enabled via header
3	RXD	Input	4	RTS	Output
5	TXD	Output	6	CTS	Input
7	DTR	Output Enabled via header	8	No Connect	
9	GND		10	3.3V	

All signals are 0 to 3.3 V logic signals.

To use header JP2, disable the RS-232 transceiver, U3, by placing a jumper on both JP8 pins.

To use header JP6, disable the RS-232 transceiver, U6, by placing a jumper on both JP9 pins.

Using the Optional Serial Signals

Signals GPIO 1 to 6 can be used as GPIO or Serial Port control signals DTR, DSR and DCD.

To configure signals DTR, DSR and DCD, place a jumper between JP4 and JP5 for that signal, as shown in Figure 7.

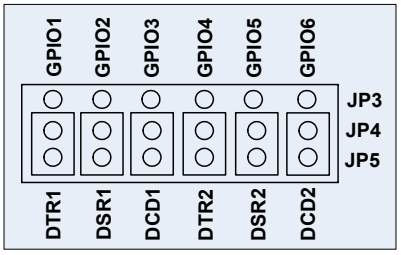


Figure 7 Optional Serial Signals

To select the GPIO signals, place the jumper between JP3 and JP4. The GPIO signals are available at JP7

Standard serial RS-232 signals are available on the DB-9 connectors J2 and J3 for serial ports 1 and 2, as shown in Figure 8.

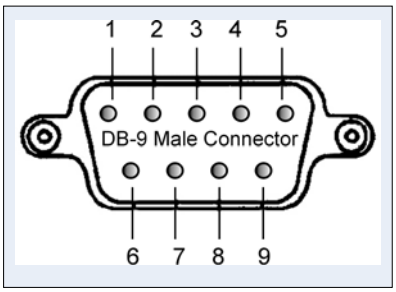


Figure 8 Serial Port DB-9 Connector

Table 6 DB-9 Pinouts for RS-232 Mode

DB-9	RS-232 Signal	Type
1	DCD	Input Enabled via header
2	RXD	Input
3	TXD	Output
4	DTR	Output Enabled via header
5	Ground	
6	DSR	Input Enabled via header
7	RTS	Output
8	CTS	Input
9	NC	

General Purpose IO

The GPIOs, located on JP7, can be used for controlling or monitoring OEM functions. External pull-ups are recommended for customization.

NOTE: GPIO 7 is fixed as a switch input and GPIO 8 is fixed as an LED output.

Table 7 General Purpose IO Signal Descriptions

Pin	Signal	Selectable	Pin	Signal	Selectable
1	GPIO_1	Via JP3	2	GPIO_2	Via JP3
3	3.3V		4	GPIO_3	Via JP3
5	GPIO_4	Via JP3	6	GND	
7	GPIO_5	Via JP3	8	GPIO_6	Via JP3
9	GPIO_7		10	3.3V	
11	GPIO_8		12	GPIO_9	
13	GPIO_10		14	GND	
15	—		16	3.3V	
17	—		18	—	
19	—		20	—	

To use the first 6 GPIOs, place a jumper between JP3 and JP4 for the specific GPIO.

Table 8 General Purpose I/O Signal Description

Evaluation Daughtercard GPIO	CN210 GPIO	I/O	Drive High/Low	Description
1	2	I/O	6/6 mA	Set as input or output
2	3	I/O	6/6 mA	Set as input or output
3	4	I/O	6/6 mA	Set as input or output
4	5	I/O	6/6 mA	Set as input or output
5	6	I/O	6/6 mA	Set as input or output
6	7	I/O	6/6 mA	Set as input or output
7	48	I or I/O	6/6 mA	Switch input 1 = off 0 = switch depressed
8	49	O or I/O	6/6 mA	LED_1 1= off 0 = illuminated

Evaluation Daughtercard GPIO	CN210 GPIO	I/O	Drive High/Low	Description
9	50	O or I/O	6/6 mA	LED_2 or used as a GPIO 1= off 0 = illuminated
10	51	O or I/O	6/6 mA	LED_3 or used as a GPIO 1= off 0 = illuminated
	43	O	6/6 mA	SPI chip select
	44	O	6/6 mA	Ethernet PHY 1 = power down 0 = off (default)
	47	O	6/6 mA	Ethernet PHY 1 = not reset (default) 0 = reset#
	52	I	6/6 mA	PCI_LED2YP input
	53	I	6/6 mA	PCI Power Management Event# input
	54	O	6/6 mA	PCI Clock 1 = clock off 0 = run# (default)

LEDs and General Purpose IO Signals

The LEDs are connected to the 10 GPIOs for easy viewing of signal activity. The first 7 GPIOs drive the first 7 LEDs, D4 to D10. The last 3 GPIOs 8 to 10 drive LEDs D1 to D3. Logic 0 and 0 volts on GPIO_x illuminates the LED.

Table 9 LED and GPIO Descriptions

GPIO	LED
GPIO_1	D4
GPIO_2	D5
GPIO_3	D6
GPIO_4	D7
GPIO_5	D8
GPIO_6	D9
GPIO_7	D10
GPIO_8	D1 orange
GPIO_9	D2 yellow

GPIO	LED
GPIO_10	D3 green

RS-232 Cable

The supplied DB-9 female-to-female null modem cable is wired as shown below.

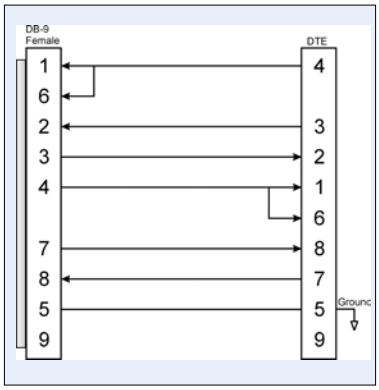


Figure 9 RS-232 Cable Pinouts

Table 10 RS-232 Cable Pinout Description

Pin	Description
1	DCD (Data Carrier Detect) Input
6	DSR (Data Set Ready) Input
2	RxD (Receive Data) Input
3	TxD (Transmit Data) Output
4	DTR (Data Terminal Ready) Output
7	RTS (Request To Send) Output
8	CTS (Clear To Send) Input
5	Ground

Additional OEM Interface Signals

The output LED signals ORLED-, GRLED- and YELED- represent the state of the LEDs on the module. Logic 0 indicates the LED is on, and Logic 1 indicates the LED is off. Buffers are recommended if LEDs are to be driven on the end-user side.

The SWITCH signal is connected to a momentary pushbutton switch on the evaluation daughtercard and is in the normally open position. Depressing the switch causes a short to ground. A 4.7 K-ohm pull-up resistor to +3.3 VDC is connected. The module's processor monitors this signal. The end-user can drive or use open-collector to this signal to either logic level or can monitor this signal as an input.

OEM Interface Electrical Characteristics

Table 11 OEM Signal Parameter Descriptions

Parameter	Symbol	Condition	Minimum	Maximum	Unit
Input high voltage	Vih		2.0▼		Volts
Input low voltage	Vil			0.7	Volts
Output high voltage UART0_TXD, UART0_RTS, UART1_TXD, UART1_RTS	Voh	Ioh = 4mA	2.4		Volts
Output low voltage UART0_TXD, UART0_RTS, UART1_TXD, UART1_RTS	Vol	Iol = 4mA		0.4	Volts
Output high voltage GPIO 1 to 10, SPI, CS, SPI_SDO, SPI_CLK, Reset_N	Voh	Ioh = 6mA	2.4		Volts
Output low voltage GPIO 1 to 10, SPI, CS, SPI_SDO, SPI_CLK, Reset_N	Vol	Iol = 6mA		0.4	Volts
Input Leakage Current	Ii	0 < Vin < 3.3v	-10	+10	μA

Chapter 4:
Using the SX-550 WLAN Module

The SX-550 WLAN module provides a dedicated host processor and an industry-leading network protocol stack for connectivity to a traditional wired Ethernet or an 802.11a, b or g wireless local area network.

The module is easy to configure with several management options, including an internal web browser interface and the Windows-based ExtendView configuration utility. In addition, the module's internal console can be accessed using TELNET or the serial port via a command line interface for sophisticated diagnostics and configuration. It is also compatible with the SNMP MIBs I, II and has a proprietary MIB to allow complete customization and monitoring.

The two circuit boards are 1.8 x 2.4-inch six-layer integrated design using surface-mounted components. The module contains two I/O ports and three status LEDs that can be configured and programmed to meet your functional requirements.

The compact form factor offers three through-holes allowing for flexible mounting options for configurations, such as Ethernet and wireless versions. The Serial Port Emulator software allows for an easy integration with existing PC applications.

A variety of power management options ensure very low power consumption during inactive periods.

Evaluation Module Connections

You can connect the SX-550 Evaluation Daughtercard to your LAN using wireless or wired Ethernet.

Using the Wireless Method

To use wireless method:

1. Verify the Ethernet cable is disconnected from the RJ-45 jack.
2. Connect the power supply plug to the SX-550 Evaluation Daughtercard.
3. Power on the power supply.

   When the wireless connection connects with the access point, the yellow and green LEDs on the module light up simultaneously. The lights blink during activity.
4. Continue to the Access silex Console Interface section.

Using the Wired Ethernet Method

To use wired Ethernet method:

1. Connect the Ethernet cable to the RJ-45 jack. This disables the wireless card.
2. Connect the power supply plug to the SX-550 Evaluation Daughtercard.
3. Power on the power supply.
   When a link is established, the yellow and green LEDs on the module should begin blinking.
4. Continue to the Access silex Console Interface section.

Access silex Console Interface

You can access the silex Console Interface using a terminal program, such as Windows HyperTerminal.

To access HyperTerminal:

1. On a Windows computer, click **START** and select **Programs>Accessories>Communications>HyperTerminal**. The Connection Description window displays.
2. Type any name for the connection, then click **OK**. The Connect To window displays.
3. In the Connect Using list box, select a connection, then click **OK**. The default is COM1.
   The COM Properties window displays.
4. On the Port Settings tab, select the settings shown in Table 12, then click **OK**.

Table 12 Port Settings

Parameter	Setting
Bits per Second	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

5. Press **Return** until the **Local>** prompt displays. No user name is necessary.
   Now you are ready to enter console commands. For a list of the console commands, refer to Appendix A:
   Console Commands

Generating Configuration Data

You can generate and view the configuration data using the pushbuttons on the module as described in Table 13.

Table 13 Pushbutton Functions

Action	Result
Depress for less than 5 seconds	Generates configuration data output on Serial Port 1 of the module. It can be viewed with a: ▪ Terminal emulator, such as Windows HyperTerminal. ▪ Serial device that displays ASCII characters ▪ Test page if the module is connected to a serial printer
Depress for more than 5 seconds	Resets the module's configuration to factory defaults (cold reset). The unit automatically re-initializes after updating the configuration memory.
Depress for 3 seconds during power up	Places the device into console configuration mode, which can be used to configure the device using the module's serial port on Serial Port 2.

Chapter 5:
Accessing Configuration Parameters

The SX-550 is equipped with a default configuration that works with most serial-to-Ethernet and wireless connections. You can modify the settings to suit your installation requirements by accessing:

- ExtendView Utility
- HTTP Pages Using Web Browser
- Internal Command Console

If using Microsoft Windows operating systems, the ExtendView Utility is the recommended method of configuring SX-550 modules on your network. If using UNIX operating systems, accessing the HTTP pages using a web browser is the recommended method. If using a wireless SX-550 module, you can use an Ethernet or wireless connection.

In addition, the SX-550 module is compatible with network management systems using SNMP MIBs I and II protocol. The SX-550 module also supports a proprietary MIB that allows customization and monitoring.

Once you have installed and accessed the configuration software, continue to Chapter 4: Setting Configuring Parameters for information on the configuration parameters.

Access ExtendView Utility

The 32-bit Windows-based TCP/IP utility, ExtendView Utility, is used to configure and manage the serial port, network and wireless settings. You can view and configure all servers on the network simultaneously or individually.

Table 14 describes the system requirements for installing the ExtendView Utility.

Table 14 ExtendView System Requirements

Component	Requirement -- VERIFY
Personal Computer	133 MHz or higher
Microsoft Windows Operating System	98SE, ME, 2000, XP or 2003
RAM Memory	64 MB or greater
Hard Disk Space	10 MB or greater
CD-ROM Drive	

The developer's kit CD contains the ExtendView Utility software. In addition, you can download the software from the silex websites.

Installing ExtendView Utility

You can install the ExtendView Utility using the CD contained in your evaluation kit or accessing the website.

To install ExtendView from CD:

1. Power on the personal computer, then access the network.
2. Connect the SX-550 module to the network using an Ethernet cable.
3. Power on the SX-550 module.
4. Insert the silex CD in the CD-ROM drive of the computer. The CD should display automatically.
   If not, click the Windows **Start** menu, and select **Run>Browse**, then select the CD. The Browse window displays.
5. Select **Utilities**, then **ExtendView** and select **Setup**. The Run window displays.
6. Click **OK**. The InstallShield Wizard displays. The InstallShield Wizard walks through the installation process.
7. Once install is complete, remove CD from CD-ROM drive.
8. Continue to the Using ExtendView Utility.

NOTE: You can also install ExtendView from the silex web site at www.silexamerica.com.

Using ExtendView Utility

To start ExtendView:

1. On the Windows main page, select **Start**/**Programs**.
2. Select **silex technology**, then **ExtendView**. The ExtendView Utility displays.

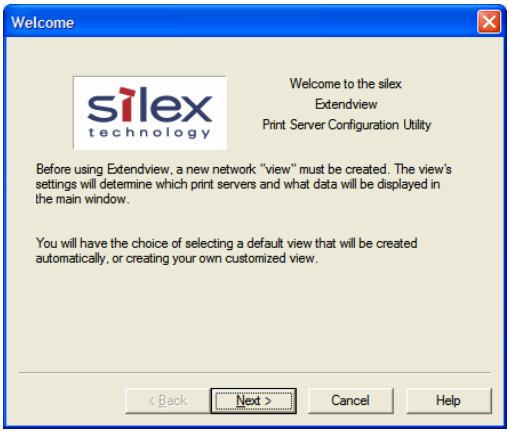

Welcome
silex technology
Welcome to the silex
Extendview
Print Server Configuration Utility
Before using Extendview, a new network "view" must be created. The view's settings will determine which print servers and what data will be displayed in the main window.
You will have the choice of selecting a default view that will be created automatically, or creating your own customized view.
< Back
Next >
Cancel
Help

Figure 10 ExtendView Main Page

You must create a view to determine which servers on your network will be discovered and how that information is displayed.

During the initial start up of the utility, the New View wizard begins.

3. To continue, click **Next**. To ext, click **Cancel**. The New View window displays.

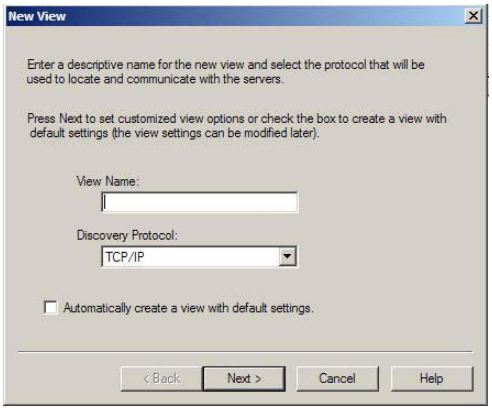

New View
Enter a descriptive name for the new view and select the protocol that will be used to locate and communicate with the servers.
Press Next to set customized view options or check the box to create a view with default settings (the view settings can be modified later).
View Name:
Discovery Protocol:
TCP/IP
Automatically create a view with default settings.
< Back
Next >
Cancel
Help

Figure 11 ExtendView New View Window

4. In the View Name field, type any view name.
   Select the protocol for locating and communicating with the servers.
   To automatically create a new view with default settings, select the checkbox. View settings can be modified at a later time.

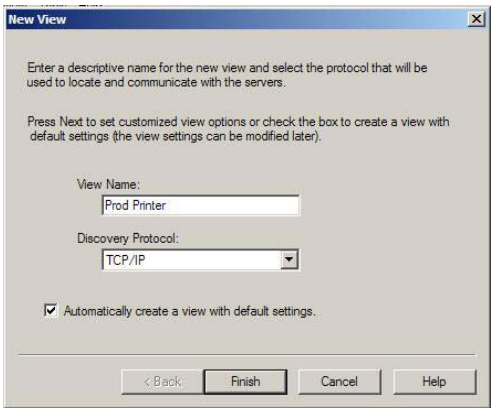

New View
Enter a descriptive name for the new view and select the protocol that will be used to locate and communicate with the servers.
Press Next to set customized view options or check the box to create a view with default settings (the view settings can be modified later).
View Name:
Prod Printer
Discovery Protocol:
TCP/IP
Automatically create a view with default settings.
< Back
Finish
Cancel
Help

Figure 12 Create View with Default Settings

5. Click **Finish**. The ExtendView window displays a list of servers on the network.
6. Select the SX-550 module, then right click to display the menu.
   The default SX-550 module name is SDSxxxxxx where xxxxxx is the last six digits of the MAC address from the label located on the back of the SX-550 module.

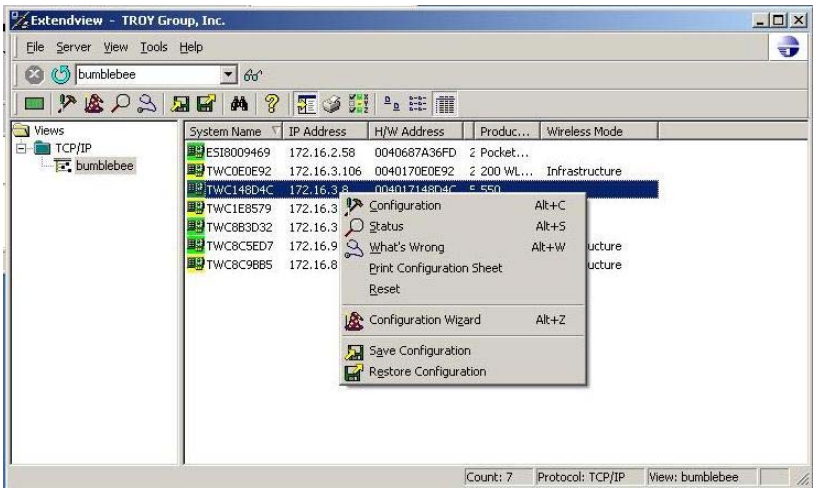


Figure 13 ExtendView Window

7. Select **Configuration**. The Server Configuration window displays as shown in Figure 14.

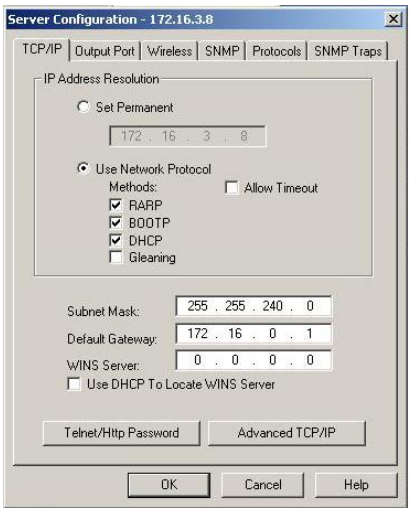


Figure 14 ExtendView Configuration Window

8. If no DHCP server exists, Extendview will prompt for a password before the configuration page displays. If you are unsure of the IP address, check with your network administrator.
9. If using a wireless SX-550 module, configure the wireless settings by selecting country or region for the region of operation.

   NOTE: It may not be legal to operate the SX-550 module in a country or region other than the country or region shown in the drop-down list. If your country or region is not listed, please check with your local government agency.

   Set the wireless mode as ad-hoc or infrastructure, SSID channel, and WEP encryption of the wireless SX-550 module to the same configuration as the wireless network where you are communication. All nodes must have the identical same settings to communicate with each other.
10. Continue to Chapter 6:
    Setting Configuration Parameters.

Access HTTP Pages

You can manage and configure the SX-550 module using a standard web browser, such as Internet Explorer or Mozilla Firefox.

NOTE: Prior to accessing the SX-550 module, you must configure the IP on both the computer and SX-550 module.

To access the HTTP Pages:

1. Connect an Ethernet cable from your network hub to the SX-550 module.
2. Power on the computer and SX-550 module.
   If the SX-550 module is connected to a serial device that cannot display or print ASCII characters, then it is recommended that another serial device capable of displaying or printing ASCII characters be temporarily connected to the SX-550 module. This ensures you can view the IP address assigned by the DHCP server to the SX-550 module. The IP address must be different than the IP address used by the computer.

To send configuration data to the serial device, press the **Test** button on the SX-550 module. The serial device should display or print the IP address assigned to the SX-550 module by your network DHCP service.

If your network does not use DHCP, then the SX-550 module will have the default IP address of 192.0.0.192.

Note: When using the SX-550 module wirelessly, verify you are communicating using AdHoc mode with the SSID configured as 'serserv.'

3. Enter the password. The default password is ACCESS. The SX-550 configuration home page displays.

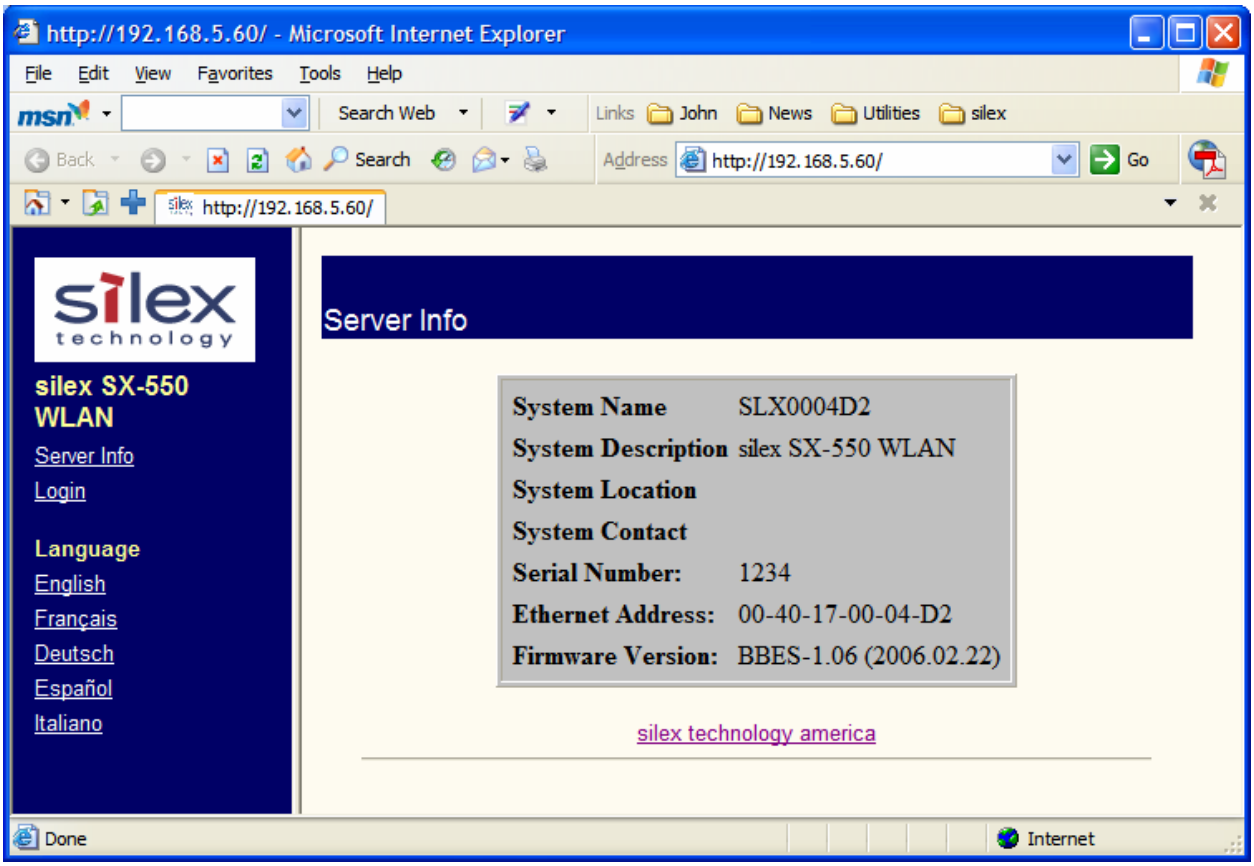


Figure 15 SX-550 Home Page

4. Continue to Chapter 6:
Setting Configuration Parameters.

Access Internal Command Console

You can access the Command Console by using the following methods:

- SX-550 Evaluation Daughtercard's Ethernet port using a Telnet session
- SX-550 Evaluation Daughtercard's serial port or console port using a terminal emulator

- SX-550 Web Page Configuration

Using Telnet Session

To access using telnet:

1. Connect the SX-550 module's Ethernet cable to the host computer.
2. On the Windows main page, select **Start**>**Run**. The Run window displays.
3. Type the following command, then click **OK**.

   ```
   telnet x.x.x.x
   where x.x.x.x is the IP address of the SX-550 module
   ```

   The default port is 23.
4. When the connection is established, press **Enter**. The # prompt displays.
5. Type the password (default is ACCESS), then press **Enter**. The password will not echo on your screen.
6. Press **Enter** until the **Local>** prompt displays. No user name is necessary. You can begin configuring the SX-550 module.

   Continue to Chapter 6:
   Setting Configuration Parameters.

NOTE: For the list of console commands, refer to Appendix A:
Console Commands.

Using Terminal Emulator through the Serial Port

To access using the serial port:

1. Attach the null modem serial cable from the DB9 serial port on the SX-550 module to the COM port on the computer.
2. If you do not wish to cycle the SX-550 module's power to enter the console mode, continue to step 3.

   To enter the console mode by cycling the SX-550 module's power, press and hold the SX-550 module's test button for at least three seconds while powering the device.

   The SX-550 module will begin initializing.
3. Start a terminal emulation program, such as Windows HyperTerminal, by selecting **Start**/**Programs**/**Communications**/**HyperTerminal**. The Connection Description window displays.
4. Type a name for the connection, then click **OK**. The Connect To window displays.
5. In the Connect Using list box, select a connection, then click **OK**. The default is COM1.

   The COM Properties window displays.
6. On the Port Settings tab, select the settings shown in Table 15, then click **OK**.

Table 15 Port Settings

Parameter	Setting
Bits per Second	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

7. Press **Return** to display the Local prompt.

   To display the IP address, type Local> `sh ip`.

   The console displays the boot information, such as IP Address, Subnet Mask, IP Gateway, LPD Banner, LPD Retries, Boot Tries, Boot Method, Maximum Window, Timeout, Keepalive, Service, Port and TCP Port.

   NOTE: If you manage and configure the SX-550 module using the embedded HTTP pages, you will need to configure the IP address in both the computer and SX-550 module.

8. Continue to Chapter 6:
   Setting Configuration Parameters.

Using AT Modem Commands

The Evaluation Daughtercard contains a wireless serial device firmware with optional data filter for configuring using AT style modem commands. This feature allows devices with an existing AT command interface to configure the unit, if the AT commands can be properly modified. You must be familiar with the general operation of AT commands. Note that AT command processing is not enabled by default. Use the command SET PORT S1 FILTER AT to enable this feature.

All commands begin with AT and are terminated by a new line unless noted below. While standard AT commands are defined to be 40 characters or less (not including the AT), the server accepts commands of up to 80 characters.

Standard AT Commands Supported

The following standard AT commands are interpreted by the device server. The data channel must be in the command mode for commands to be recognized. The data channel will be in command mode upon power up or reset.

There are two operating modes for the unit when the AT command option is enabled. In command mode, data received from the serial port is passed to the AT command processor, and responses are returned to the serial port. No data is sent to any network application, and any data received from the network is ignored. In data mode, data from the serial port passes to the network application, and vice versa. This is equivalent to the normal serial port operating mode without the AT command option.

Table 16 describes the AT Commands. Table 17 details the Extended AT Commands that allow the configuration of the network server operating parameters.

Any AT command received, except the listed commands, are acknowledged with OK status. This allows existing modem applications to transmit commands without causing an error. These include AT<X>n, but not currently AT&<X>n, AT%<X>n, AT\<X>n, where <X> is a letter.

Table 16 AT Commands

Parameter	Command	Description
Enter Command mode	<delay>+++<delay>	If the string +++ is seen in data mode, with no characters sent for 1 second before or after, then command mode is entered.
Initiate Connection Command	ATD <destination>	Standard modem dialing command, redefined to initiate an internet connection to a remote computer. Indicates the IP address of the target, and optionally the TCP port number to use for connection. The T or P option (ATDT or ATDP) can be present and has no effect. If present, the IP address must be exactly 12 decimal digits with 3 for each byte of the address. If no IP address is given, then the ecable destination address defined for the port is used. If the destination TCP port is defined, it is separated from the IP address by a '#' character, and is 1 to 5 decimal digits. If TCP port is defined, the ecable destination port defined for the serial port is used. If the destination port is 0, the standard Telnet port (23) is used. If the destination string ends with a semicolon, the server remains in the command mode, not the data mode, once a connection is made. In command mode data is not passed from the remote computer, so data could be lost if the unit stays in command mode. If the connection cannot be attempted, NO CARRIER status is returned. If the connection attempt fails, NO ANSWER status is returned. If the connection succeeds, CONNECT status is returned.
Echo control	ATEn	If n=0, commands are not echoed. If n=1, subsequent commands will be echoed. The default, upon unit reset, is for no echo (ATE0).
Disconnect	ATHn	If n=0, any connection to a remote host is dropped. Other value of n is ignored.
Return to data mode	ATOn	Exits command mode and places the serial port in the data mode. All subsequent data is sent to the network application, if connected, until an enter command mode sequence is received. Any value of n is ignored, if present.

Parameter	Command	Description
Quiet mode	ATQn	If n = 1, no result codes are returned. If n = 0, result codes are returned to the local device. 0 is the reset default value.
Verbose mode	ATVn	If n = 0 and not in quiet mode, result codes are returned in numerical form. If n = 1, results are returned as text. 1 is the reset default value.

Table 17 Extended AT Commands

Parameter	Command	Description
Console pass through	AT#C<string>	Passes the string to the server configuration console. The string can be any valid console command. Refer to your server documentation for console commands available on your unit. Since this command does not follow the normal AT command format of <command><number>, it must be the last command on the line unless the next command is a '#' command. All characters up to the end of line or a '# will be considered part of the console command. If console quiet mode is not is enabled, then the response will be the standard console task response. Example: `AT#Cset nw ssid silex#Csave`
Console Quiet mode	AT#Qn	If n = 0, a response to a #C command is given. If n = 1, the response is not provided. The default after reset is 1.

Response Codes

Table 18 details the response codes for codes other than #C commands.

Table 18 Response Codes

Numeric Code	Description
0	OK
2	No Carrier
4	Error
5	Connect
8	No Answer

Chapter 6:
Setting Configuration Parameters

The SX-550 module is equipped with a default configuration that works with most serial-to-Ethernet and wireless connections. You can modify the settings to suit your installation requirements.

ExtendView is the recommended method for setting configuration parameters. However, regardless of the method to access the configuration parameters, the method for modifying the parameters is virtually identical.

Factory Default Settings

Table 19 displays the configuration parameter descriptions and settings with the default settings indicated in a separate column.

Table 19 Factory Default Settings

Parameter	Description	Settings	Default Setting
Character	Bits per character	7, 8	8
Flow	Flow control	None, Xon, Xoff, CTS/RTS	None
Parity	Parity	None, Even, Odd, Mark, Space	None
Speed	Baud rate of bits per second	300, 600,1200, 2400, 3600, 4800, 7200, 9600, 14400,19200, 38400, 57600, 76800, 115200, 230400, 460800, 921600	9600 115200 – console port default
Stop	Stop bits per character	1, 2	1
Mode	Line mode or serial port protocol	232, 422, 485, 485HD, Disabled	232
Ecable	E-cable mode for TCP connections	Enable, Disable	Disable
Ecaddr	E-cable destination IP address	Set by user	N/A
Econn	E-cable connection attempt time	1-255 seconds	30 seconds

Parameter	Description	Settings	Default Setting
Ecport	E-cable destination IP port number	9100 or set by user	9100

Restoring Factory Default Settings

The factory default settings can restored at any time. Simply perform a cold reset by pressing and holding the module push button for more than five seconds.

Modify Basic Settings

To establish communication between the SX-550 module and a serial device, the settings must be identical for both devices.

Changing Serial Settings

The serial settings, such as mode and baud rate or speed for both the SX-550 module and serial device must be identical in order to communicate. You can change the serial settings using ExtendView (recommended), the web browser interface, or the SX-550 module's internal configuration console.

To change serial settings:

1. Using ExtendView, web browser interface or internal command console, click the **Output Port** tab. The Output Port window displays.

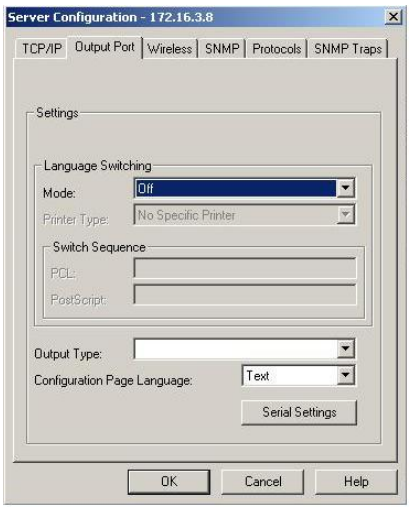


Figure 16 Output Port Tab

2. Click **Serial Settings**. The Serial Settings window displays.

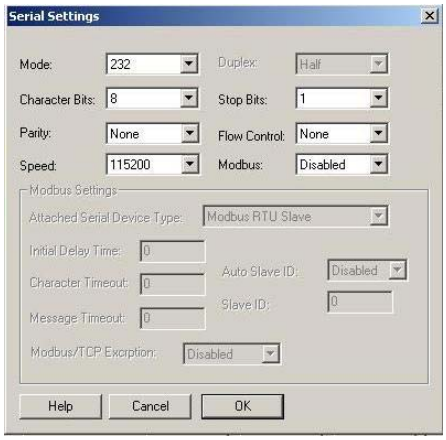


Figure 17 Serial Settings Window

3. Configure the serial settings, as defined in Table 20.

Table 20 Serial Setting Parameters

Parameter	Setting
Mode	Sets the line mode or serial port protocol. RS-232 provides an interface between data terminal equipment and data communications equipment employing serial binary data interchange over a wired connection with a maximum range of 50 feet (16.5 meters). RS-422 provides a data transmission system using balanced differential signals or voltages to send serial binary data over a wired connection with a maximum range of 4,000 feet (1.2 km). Sets the line mode or serial port protocol. Values are: 232 (default), 422, Disabled
Character Bits	Sets the bits per character Values are: 8 (default), 7
Parity	Sets parity checking to detect any errors in transmission. Values are: None (default), Even, Odd, Mark, Space
Speed	Sets the baud rate for measuring for data transmission speed Values are: 9600 (default), 115200 (console port default) 300, 600,1200, 2400, 3600, 4800, 7200, 14400,19200, 38400, 57600, 76800, 230400, 460800, 921600

Parameter	Setting
Stop Bits	Sets the number of extra bits that mark the end of a unit of transmission. Values are: 1 (default), 2
Flow Control	Manages data flow between computers or devices so data can be handled at an efficient pace. Values: None (default), Xon, Xoff, CTS/RTS

4. To accept changes, click **OK**.

   To cancel, click **Cancel**.

   For additional help, click **Help**.

NOTE: You can configure the same settings using the Web Page configuration. Simply log in using the SX-550 IP address and select the I/O ports. For the changes to become effective, submit the changes, then reset the device.

Modifying TCP/IP Settings

You can modify the TCP/IP settings using ExtendView (recommended), the web browser interface or the SX-550 module's internal configuration console.

To modify TCP/IP settings:

1. Using ExtendView, web browser interface or internal command console, click the **TCP/IP** tab. The TCP/IP window displays.

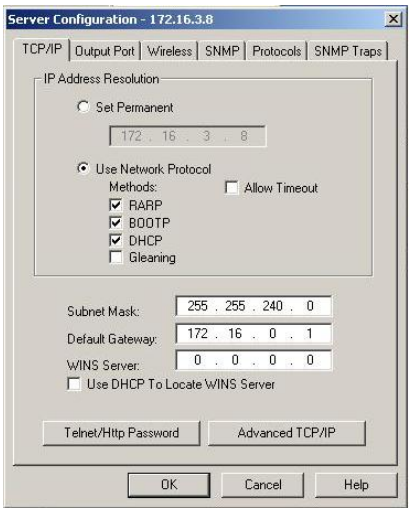


Figure 18 TCP/IP Window

2. Verify the settings, as defined in Table 21.

Table 21 TCP/IP Settings

Parameter	Setting
IP Address Resolution	Sets the exchanges among network interfaces connected to an Ethernet media segment and maps IP address to Ethernet addresses, Media Access Control (MAC) addresses and hardware addresses. The **Set Permanent** radio button sets the IP address permanent. The IP address must follow the format XXX.XXX.XXX.XXX, where each XXX is a number between 0 and 255. The Use Network Protocol Select radio button determines which IP address at power up.
Subnet Mask	Sets the address of the subnet mask The subnet mask must follow the format XXX.XXX.XXX.XXX, where each XXX is a number between 0 and 255. The default subnet mask is 0.0.0.0. The server interprets a subnet mask of 0.0.0.0 or 255.255.255.255 as no subnet mask specified.
Default Gateway	Sets the default gateway, if your network is attached to other networks
WINS Server	Sets the Windows Internet Naming Service (WINS) address Values are set by user.
Use DHCP to Locate WINS Server	Uses the automatic location feature in ExtendView to locate the WINS servers.

3. To change the Telnet/HTTP password, click Telnet/HTTP Password. The Change Password window displays.

Figure 19 Change Password Window

Type the new password in the **New Password** field, then in the **Verify Password** field.

Click **OK** to change the password or click **Cancel** to exit.

4. Click **Advanced TCP/IP**. The Advanced TCP/IP Configuration window displays.

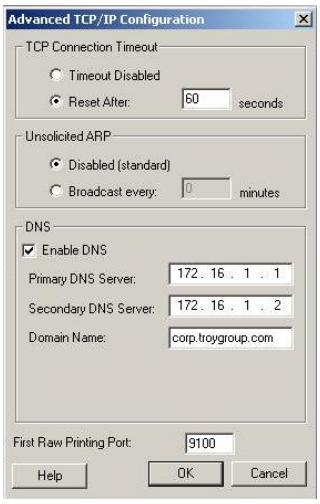


Figure 20 Advanced TCP/IP Configuration Window

5. Configure the settings, as defined in Table 22.

Table 22 TCP/IP Configuration Settings

Parameter	Setting
TCP Connection Timeout	Sets the timeout and reset values for the TCP connections
Unsolicited ARP	Blocks or broadcasts unsolicited ARP
DNS	Sets the DNS addresses

6. To accept changes, click **OK**.

   To cancel, click **Cancel**.

   For additional help, click **Help**.

NOTE: You can configure the same settings using the Web Page configuration. Simply log in using the SX-550 IP address and select the I/O ports. For the changes to become effective, submit the changes, then reset the device.

Configure Simple Network Management Protocol

The SX-550 module contains a Simple Network Management Protocol (SNMP) agent that collects and stores management information for network managers using standard SNMP commands. The management information is referenced as a hierarchically organized database called a Management Information Base (MIB).

To prevent naming conflicts, all of the manageable features of all products from all vendors are arranged in a single tree structure. Each vendor of SNMP equipment has an exclusive section of the MIB Tree .

Each branch of the MIB Tree has a number and name. The path from the top of the tree down to the point of interest forms the name of that point. A name created in this way is known as an Object ID or OID.

Table 23 describes the messages used to communicate between the network manager and the SNMP agent, as defined in RFC 1157. Each SNMP message must contain a Community Name, which is used like a password. The default Community name for the SX-550 module is PUBLIC.

Table 23 SNMP Commands

Command	Description
GET	Retrieves management information for a specific managed object contained in the agent. The GET message must contain the OID for the specified object. The response is a GET-RESPONSE message containing either the current value of the requested object, or an indication as to why the request failed.
GET NEXT	Retrieves management information from a non-specific managed object. The GET NEXT contains either a complete OID or a fragment of an OID. The response is a GET-RESPONSE message containing either the OID and data of the item immediately right of the specified OID in the tree or an indication as to why the request failed.
GET RESPONSE	This is the information sent back from the unit in response to the GET, GET NEXT command.
SET	Requests a change to the value of a specified object. The response is a GET-RESPONSE message with either an indication that the requested change had been made or with an indication as to why the request failed.
TRAP	Sends a one-way notification from the agent to the manager that a significant event has occurred. This is the only message initiated by the SNMP agent.

To set the SNMP Traps:

1. Using ExtendView, web browser interface or internal command console, click **SNMP Traps** tab. The SNMP Traps window displays.

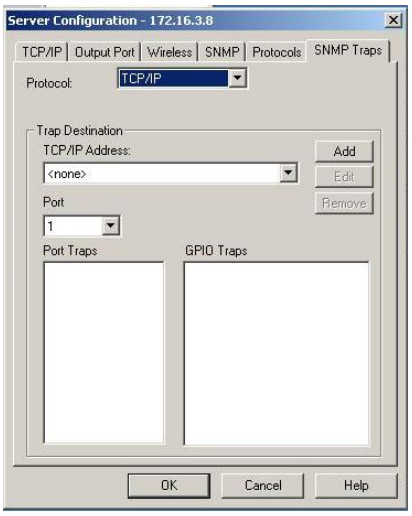


Figure 21 SNMP Traps

2. Configure the settings as defined in Table 24.

Table 24 SNMP Trap Settings

Parameter	Setting
Protocol	Sets the protocol
Trap Destination – TCP/IP Address	Sets the IP address for the trap destination
Port	Sets the port location
Port Traps	Sets the port traps
GPIO Traps	Sets the GPIO traps

3. To accept changes, click **OK**.

   To cancel, click **Cancel**.

   For additional help, click **Help**.

Configuring GPIO Alerts and Traps

The SX-550 module has eight General Purpose I/O (GPIO) lines available for use on connector J7. These GPIO lines are individually programmable for either input, output, or special purpose. By default, all the GPIO lines are configured for special purpose use.

Lines configured for input can be used as a source for SNMP traps and/or email alerts. The GPIO direction, trigger settings, and email/web page message strings are configured from the Internal Configuration Console interface.

Table 25, Table 26 and Table 27 describe the GPIO Commands.

Table 25 GPIO Commands

Command	Description
SHOW GPIO DIR	Shows current direction setting of GPIO lines
SET GPIO DIR *IN|OUT <GPIO #>* GPIO # = {1|2|3|4|5|6|7|8}	Sets GPIO Direction In/Out

Example:

```
Local> show gpio dir

GPIO Direction
--------------
1 [OUT]
2 [IN]
3 [IN]
4 [IN]
5 [SPCL]
6 [SPCL]
7 [SPCL]
8 [SPCL]

Local> set gpio dir in 1

Local> set gpio dir out 2

Local> show gpio dir


GPIO Direction
--------------
1 [IN]
2 [OUT]
3 [IN]
4 [IN]
5 [SPCL]
6 [SPCL]
7 [SPCL]
8 [SPCL]
```

Command	Description
SHOW GPIO SPECIAL	Shows functional mode of GPIO lines
SET GPIO SPECIAL *ENA/DIS* <*GPIO #*> GPIO # = {1|2|3|4|5|6|7|8}	Sets GPIO special function mode

Example:

```
Local> show gpio special

GPIO Special Functions
----------------------
GPIO #1 is special
GPIO #2 is normal
GPIO #3 is special
GPIO #4 is special
GPIO #5 is special
GPIO #6 is special
GPIO #7 is special
GPIO #8 is special

Local> set gpio special disable 1

Local> set gpio special enable 2

Local> show gpio special


GPIO Special Functions
----------------------
GPIO #1 is normal
GPIO #2 is special
GPIO #3 is special
GPIO #4 is special
GPIO #5 is special
GPIO #6 is special
GPIO #7 is special
GPIO #8 is special
```

Table 26 GPIO Trigger Commands

Command	Description
SHOW GPIO TRIGger	Shows current GPIO trigger conditions and corresponding TRAP number
SET GPIO TRIGger <*trigger state*> <*GPIO #*> Trigger state = {1| 0 | dis} GPIO # = {1|2|3|4|5|6|7|8}	Sets GPIO Trigger Condition 1: 0 to 1 transition 0:1 to 0 transition Dis: Disable

Example:

```
Local> set gpio trig 1 1
```

Command	Description

```
Local> set gpio trig 0 2

Local> show gpio trig

GPIO Trigger Conditions
-----------------------
trig if GPIO #1 is 1 <Trig #1>
trig if GPIO #2 is 0 <Trig #2>

GPIO #2 is set for OUTPUT
GPIO #3 is set for OUTPUT
```

Table 27 GPIO Transmit Commands

Command	Description
SHOW GPIO TRANsmit SHOW GPIO TRANsmit <trig #> trig # = 0 to 7	Displays email or web page strings assigned to GPIO triggers
SET GPIO TRANsmit <trig #> <string> trig # = 0 to 7	Sets transmit string corresponding to trigger condition
DEL GPIO TRANsmit <trig #> trig # = 0 to 7	Deletes transmit string corresponding to trigger condition

Example:

```
Local> show gpio tran

Trig #   Email String
------   ------------
  0:     GPIO #1 is 1
  1:     GPIO #2 is 1

Local> set gpio tran 0 your email text msg here

Local> show gpio tran

Trig #   Email String
------   ------------
  0:     your email text msg here
  1:     GPIO #2 is 1

Local> show gpio tran 1
  1: GPIO #1 is 1
```

Configuring Serial Port Monitor Alert and Trap Configuration

The SX-550 module can be configured to scan and compare the data received on the serial port to user-defined strings. A match with a string can be a source for SNMP traps and/or email alerts.

The match strings and corresponding email or web page message strings are configured from the Internal Configuration Console interface.

Table 28 describes the Monitor Alert and Trap Configuration Commands.

Table 28 Port Monitor Alert Commands

Command	Description
SHOW PORT S1 TRIGMON	Shows strings and index numbers being monitored
SET PORT S1 TRIGMON <*trig #*> <string>	Assigns a string to be monitored on the serial port

Example:

```
Local> show port s1 trigmon

Index #  Monitor String
------   --------------

Local> set port s1 trigmon 0 trigger on seeing this string

Local> show port s1 trigmon

Index #  Monitor String
------   --------------
  0:     trigger on seeing this string
```

Table 29 TRIGMON Commands

Command	Description
SHOW PORT S1 TRIGXMT	Shows email or web page strings associated with TRIGMON index numbers
SET PORT S1 TRIGXMT <index #> <string> Index # = 0 to 7	Assigns email or web page string to specified TRIGMON index number

Example:

```
Local> show port s1 trigxmt

Index #  Xmit String
------   ---------------
  0:     xmit string 0     <<< default msg string

Local> set port s1 trigxmt 0 The trigger string was seen!

Local> show port s1 trigxmt

Index #  Xmit String
------   ---------------
  0:     The trigger string was seen!
```

Chapter 7: Designing with the SX-550

OEM Header Interface

Table 30 describes the OEM header interface pinout for the SX-550 WLAN Module. Table 31 describes the OEM interface signal descriptions. All input and output signals, except the differential signals, are 0 to 3.3 V logic signals.

Table 30 OEM Header Interface Pinout

Pin	Signal	Pin	Signal
1	TPRX+	2	TPTX+
3	TPRX-	4	TPTX-
5	GPIO_7	6	GPIO_8
7	AVDD	8	+3.3VDD
9	UART0_RXD	10	GPIO_9
11	UART0_TXD	12	GPIO_10
13	GND	14	+3.3VDC
15	UART0_RTS	16	UART0_CTS
17	UART1_RTS	18	UART1_CTS
19	GND	20	GND
21	UART1_TXD	22	UART1_RXD
23	GND	24	RESET_N
25	SPI_CS	26	SPI_CLK
27	+3.3VDC	28	GND
29	GPIO_1	30	SPI_SDO
31	GPIO_2	32	SPI_SDI
33	+3.3VDC	34	GND
35	GPIO_3	36	GPIO_4
37	GND	38	GND
39	GPIO_5	40	GPIO_6

Table 31 OEM Interface Signal Description

Signal	Pin	Type	Description
TPRX+, TPRX-	1,3	Differential Output	Ethernet Transmit Data primary
TPTX+, TPTX-	2,4	Differential Input	Ethernet Receive Data primary
AVDD	7	Power	Ethernet Power Output to transformer center tap
UART0_RXD	9	Input	Serial Port 1 Receive Data
UART0_TXD	10	Output	Serial Port 1 Transmit Data
UART0_RTS	15	Output	Serial Port 1 Request To Send
UART0_CTS	16	Input	Serial Port 1 Clear to Send
UART1_RXD	22	Input	Serial Port 2 Receive Data
UART1_TXD	21	Output	Serial Port 2 Transmit Data
UART1_RTS	17	Output	Serial Port 2 Request To Send
UART1_CTS	18	Input	Serial Port 2 Clear to Send
GPIO1, GPIO2, GPIO3, GPIO4, GPIO5, GPIO6, GPIO7, GPIO8, GPIO9, GPIO10	29, 31, 35, 36, 39, 40, 5, 6, 10, 12	Input/Output	General Purpose Input/Output Signals 1-10, User defined
SPI_CS	25	Output	Serial Peripheral Interface Chip Select (high-true)
SPI_SDO	30	Output	Serial Peripheral Interface Data Out
SPI_SDI	32	Input	Serial Peripheral Interface Data In
SPI_CLK	26	Output	Serial Peripheral Interface Clock
RESET_N	24	Output	Power-on Reset (low true)
+3.3VDC	8, 14, 27, 33	Power	Power VCC Input
GND	13, 19, 20, 23, 28, 34, 37, 38	Power	Power Ground

The SX-550 module uses the 40-pin 1.27 mm pitch male header by Gradconn part number BB02-BK401-K03-3040B0.

Mating 4.6 mm tall female headers are:
Gradconn Interconnect part number: BB02-CL402-K03-000000
www.gradconn.com

Samtec part number: SFMC-120-02-S-D
www.samtec.com

Imperial Connector Systems part number: B2B-401-B-C
www.imperial-connect.com

E-tec Interconnect part number: BS2-040-H450-11/11AT
www.e-tec.ch

Antenna Connectors

The SX-550 WLAN Module has two SMT Ultra-miniature coaxial connectors (U.FL). Table 32 describes the connector types.

For single antenna use, connect to the main antenna connector, as shown in Figure 22 .

For diversity antenna use, connect to both the main and auxiliary connectors.

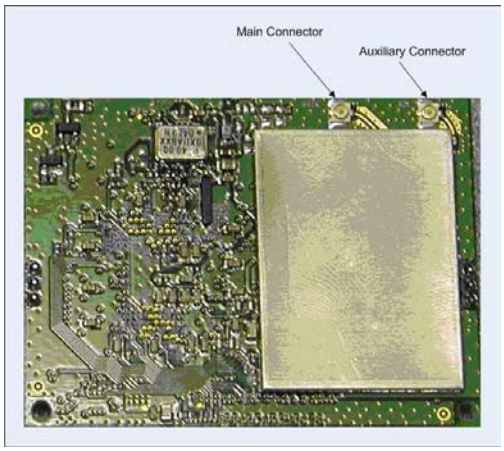


Figure 22 Main and Auxiliary Antenna Connectors

Table 32 Antenna Connector Types

Parameter	Description
Connector Type	SMT Ultra-miniature Coaxial Connector (U.FL)
Connector Size	Maximum height of 2.4 to 2.5 mm
Nominal Characteristic Impedance	50 Ohm
Rated Voltage	60 V AC (rms)
Rated Frequency	DC to 6 GHz
Contact Resistance	Center: 20 mOhm maximum Outside: 10 mOhm maximum
Insulation Resistance	500 MOhm @ 100 VDC minimum
Antenna Cable Plug	iPEX 90 degrees plug with right angle receptacle and cable diameter at 1.32 mm

For the antenna connector, the SX-550 module uses a Hirose U.FL-R-SMT (CL331-0471-0-01) ultra miniature coaxial receptacle.

Mating plugs are:
Hirose part number: U.FL-LP-066
www.hirose.co.jp

Ethernet PHY

The Ethernet PHY is located on the processor card. The manufacturer is Davicom and the part number is DM9161AE. For additional information on the layout of the transformer and RJ-45 jack, refer to the Davicom website at www.davicom.com.tw.

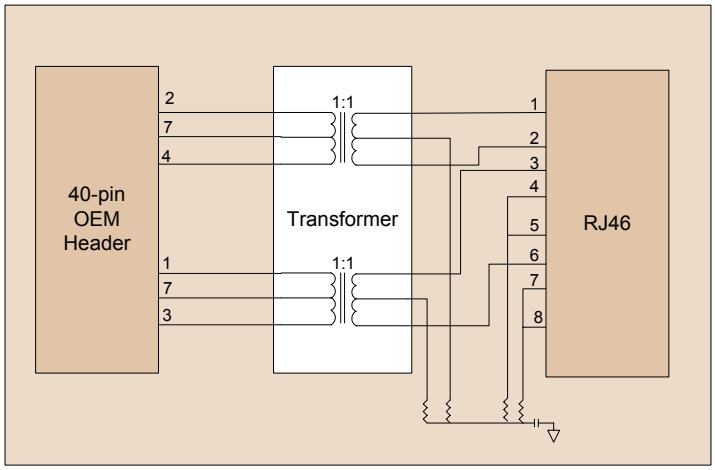


Figure 23 Circuit Diagram with Transformer

Transformer Specification

Table 33 and Table 34 detail the magnetic specifications and manufacturer sources. Magnetics that meet these requirements are available from various magnetic manufacturers. You should test and qualify the magnetic specifications prior to use in your application. The magnetics listed are electrical equivalents; however, may not be pin-to-pin equivalents.

Table 33 10/100M Magnetic Specifications

Parameter	Values	Units	Test Conditions
TX/RX Turns Ratio	1:1 CT/1:1	—	—
Inductance	350	μH minimum	
Insertion Loss	1.1	dB maximum	1 to 100 MHz
Return Loss	-18	dB minimum	1 to 30 MHz
	-14	dB maximum	30 to 60 MHz
	-12	dB minimum	60 to 80 MHz
Differential to Common Mode Injection	-40	dB maximum	1 to 60 MHz
	-30	dB minimum	60 to 1000 MHz
Transformer Isolation	1500	V	—

Table 34 10/100M Magnetics Manufacturers

Manufacturer	Part Number
Pulse Engineering	PE-68515, H1102
YCL	PH163112, PH163539
Halo	TG110-050N2, TG110-LC50N2
Bel Fuse	S358-5999-W2
Bothhand	TS6121CX, LU1S041CX, TS61210, I6ST8515, 16ST1066
GTS	FC-618SM

General Purpose I/O Interface

Table 35 details the GPIO interface. The first 10 GPIOs are user-configurable as either input or output. GPIOs 48 to 51 have default uses, but can be user configured.

Table 35 GPIO Interface

40-Pin Header GPIO	CN210 GPIO	I/O	Drive High/Low	Description
1	2	I/O	6/6 mA	Can be set as input or output
2	3	I/O	6/6 mA	Can be set as input or output
3	4	I/O	6/6 mA	Can be set as input or output
4	5	I/O	6/6 mA	Can be set as input or output
5	6	I/O	6/6 mA	Can be set as input or output
6	7	I/O	6/6 mA	Can be set as input or output
7	48	I or I/O	6/6 mA	Switch input 1 = off 0 = switch depressed
8	49	O or I/O	6/6 mA	LED_1 1= off 0 = illuminated
9	50	O or I/O	6/6 mA	LED_2 or used as a GPIO 1= off 0 = illuminated
10	51	O or I/O	6/6 mA	LED_3 or used as a GPIO 1= off 0 = illuminated
—	43	O	6/6 mA	SPI chip select

40-Pin Header GPIO	CN210 GPIO	I/O	Drive High/Low	Description
—	44	O	6/6 mA	Ethernet PHY 1 = power down 0 = off (default)
—	47	O	6/6 mA	Ethernet PHY 1 = not reset (default) 0 = reset#
—	52	I	6/6 mA	PCI_LED2YP input
—	53	I	6/6 mA	PCI Power Management Event# input
—	54	O	6/6 mA	PCI Clock 1 = clock off 0 = run# (default)

Power

Power is input to the SX-550 WLAN Module using the 40-pin OEM Header. Required voltage is 3.3VDC ± 5%.

At full power, the current consumption is 950mA.

In low power mode with the processor clock at 60MHz and the SX-550 in power save mode, the current consumption is 370mA.

Chapter 8:
Product Specifications

Table 36 Product Specifications

Component	Specifications
Model	SX-550 WLAN Module
Processor	Cavium NITROX Soho CN210
RAM Memory	16 Mbytes SDRAM.
Processor Speed	167 MHz at full power
Interfaces Supported	Serial: RS-232 w/ external transceivers Ethernet: 10/100BaseT using RJ-45 8-wire jack Serial Peripheral Interface

Table 37 Radio Performance Specifications

Parameter	Specifications
Radio Emission Type	Complies with IEEE 802.11a, b, g, h and j Direct Sequence Spread Spectrum (DSSS) physical layer.
Operating Frequency	2.412 GHz ~ 2.484 GHz ISM band 5.15 GHz ~ 5.35 GHz ISM band 5.725 GHz ~ 5.825 GHz ISM band
Data Modulation Type	Orthogonal Frequency Division Multiplexing (OFDM) Complementary Code Keying (CCK) Differential Quadrature Phase Shift Keying (DQPSK) Differential Binary Phase Shift Keying (DBPSK)
Channel Number	IEEE 802.11b and g: Channels 1 to 11 and 12 to 14 IEEE 802.11a: Channels 36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157 and 161

Parameter	Specifications
Data Rate	54 Mbps with fallback rates of 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, and 1 Mbps
Security	WEP Encryption: 64/128 bits TKIP, AES
Media Access Protocol	Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) with ACK architecture, 32 bits MAC-layer.
Antenna Connector Type	2 SMT ultra-miniature coaxial connectors
Operating Voltage	3.3 VDC ± 5%
Bus Interface	Proprietary 70-Pin
Antenna Port Impedance	50 ohm
Channel Switching Speed	260 μsec
LO Settling Time	61 μsec
Receiver Noise Figure	6.0/6.7 dB (typ/max) 2.4Ghz 9.2/9.6 dB (typ/max) 5Ghz

Transmit Output Power (Production Specification)
Test Conditions: Supply Voltage (Vcc) = 3.3V, Ambient Temperature = 25ºC

Frequency Range (Bands)	Modulation Rate	Minimum Output Power (dBm)	Typical Output Power (dBm)	Maximum Output Power (dBm)
Transmitter Power Output low band (802.11b)	1 Mbps	14	15.5	20.5
	2 Mbps	14	15.5	20.5
	5.5 Mbps	14	15.5	20.5
	11 Mbps	14	15.5	20.5
Transmitter Power Output low band (802.11g)	6 Mbps	15.5	17	21.5
	9 Mbps	15.5	17	21.5
	12 Mbps	14	15.6	20
	18 Mbps	14	15.6	20
	24Mbps	13	14.3	19
	36 Mbps	13	14.3	19
	48 Mbps	10	11.6	16
	54 Mbps	10	11.6	16
Transmitter	6 Mbps	15	16.1	21

Power Output high band (802.11a)	9 Mbps	15	16.1	21
	12 Mbps	14	15.6	20
	18 Mbps	14	15.6	20
	24Mbps	13	14.8	19
	36 Mbps	13	14.8	19
	48 Mbps	8.5	10.9	15
	54 Mbps	8.5	10.9	15

Receiver Sensitivity (Production Specification)

Test Conditions: Supply Voltage (Vcc) = 3.3V, Ambient Temperature = 25ºC

Frequency Range (Bands)	**Modulation Rate**	**Minimum Receiver Sensitivity (dBm)**	**Typical Receiver Sensitivity (dBm)**	**Maximum Receiver Sensitivity (dBm)**
Transmitter Power Output low band (802.11b)	1Mbps (8%PER)	-92	-94	/
	2 Mbps (8%PER)	-90	-92	/
	5.5 Mbps (8%PER)	-89	-91	/
	11 Mbps (8%PER)	-85	-87	/
Transmitter Power Output low band (802.11g)	6 Mbps (10%PER)	-89	-91	/
	9 Mbps (10%PER)	-87	-89	/
	12 Mbps (10%PER)	-86	-88	/
	18 Mbps (10%PER)	-83	-85	/
	24 Mbps (10%PER)	-79	-81	/
	36 Mbps (10%PER)	-75	-77	/
	48 Mbps	-70	-72	/

	(10%PER)			
	54 Mbps (10%PER)	-68	-70	/
Transmitter Power Output high band (802.11a)	6 Mbps (10%PER)	-88	-90	/
	9 Mbps (10%PER)	-86	-88	/
	12 Mbps (10%PER)	-85	-87	/
	18 Mbps (10%PER)	-82	-84	/
	24 Mbps (10%PER)	-78	-80	/
	36 Mbps (10%PER)	-74	-76	/
	48 Mbps (10%PER)	-69	-71	/
	54 Mbps (10%PER)	-67	-69	/

TCP Port Connections

The SX-550 module supports port connections over TCP/IP using raw TCP ports only. Table 38 describes the TCP ports allocations.

Table 38 TCP Port Connections

Port	Destination Device
3001	RS-232
9100	RS-232
9200	RFC 2217

Appendix A:
Console Commands

The following tables describe the console commands available from the internal command console. Access the command console through the serial port (J1), console port (JP1) or Ethernet port using a Telnet session.

Wireless and Network Security Commands

The following group of commands configures network parameters.

Table 39 Network Commands

Command	Description

SH NW	Displays summary network information
	
	Sample output:
	`WiFi Mode = INFRASTRUCTURE`
	`WiFi SSID: silex`
	`Speed = 11`
	`Regulatory Domain = 704`
	`WiFi FW Ver = 1F 1.7.1`
	`AP density = LOW`
	`TTLS is Disabled`
	`WEP is Disabled`
	`Link DOWN`

SET NW AUTHtype	Sets wireless authentication type The default value is Open System Sample output: `SET NW AUTHtype [OPEN |SHARED | TTLS | LEAP | WPA-PSK]`

Command	Description
SH NW AUTH	Shows wireless authentication type The default value is 11. Value is ignored in Infrastructure mode. Sample output: `Authentication type= OPEN SYSTEM`

SET NW CHannel	Sets WLAN ad-hoc channel number
	Sample output:
	`SET NW CHannel n`
	`n = 1-11`

SET NW ENC	Sets WLAN Encryption Mode. Supported modes are None, 64 bit WEP, 128 bit WEP, and TKIP (WPA). The default value is Disable. Sample output: `SET NW ENC [DIsable | 64 | 128 | TKIP ]`
SH NW ENC	Shows the wireless encryption mode The deprecated command SH NW WEP also displays this information. Sample output: `WiFi encryption is Disabled`

SET NW KEY#	Selects WLAN WEP key entry
	The default value is 1.
	Sample output:
	`SET NW KEY# n`
	`n = 1-4`

SET NW KEYVAL	Sets the WLAN WEP key entry to the hex value
	The default value is null.
	Sample output:
	`SET NW KEYVAL <key>`
	`key=10 or 26 hex characters`

SET NW MOde	Sets WLAN mode
	The default value is Infra
	Sample output:
	`SET NW MOde <mode>`
	`[Infrastructure | Ad-Hoc]`

SH NW MODE	Shows wireless operating mode Sample output: `Wifi mode = AD-HOC (802.11)`

Command	Description
SH NW RADio	Shows the selected radio mode of operation Sample output: `Radio mode is 802.11b`

SET NW SPeed	Sets maximum WLAN speed
	The default value is 11.
	Sample output:
	`SET NW SPeed n`
	`n = 1,2,5.5 or 11`

SH NW SPEED	Show the maximum wireless data speed in megabits per second Sample output: `Speed = 11`

SET NW SSid	Sets WLAN SSID
	The default value is printer.
	Sample output:
	`SET NW SSid <name>`
	`User defined`

CL NW SSid	Clears SSID value and allows the server to connect to any AP. Sample output: `CL NW SSid`

SET NW BSsid	Sets WLAN BSSID to connect to a specific access point's mac address
	Sample output:
	`SET NW BSsid <value>`
	`User defined (MAC Address)`

CL NW BSsid	Clears BSSID value and allows the server to use SSID, not a specific AP Sample output: `CL NW BSsid`

SET NW RTS	Sets WLAN RTS threshold
	The default value is 2432.
	Sample output:
	`SET NW RTS n`
	`n = 1-3000`

SH NW RTS	Shows wireless RTS threshold Sample output: `Wifi RTS Threshold = 2432`

SH NW STATS	Shows network I/O statistics
	Sample output:
	`WiFi statistics:`
	`TX Unicast frames: 0`
	`TX Multicast frames: 0`

Command	Description
	TX Fragments: 0 TX Unicast octets: 0 TX Multicast octets: 0 TX Deferred: 0 TX Single retry frames: 0 TX Multiple retry frames: 0 TX Retry limit exceeded: 0 TX Discards: 0 RX Unicast frames: 0 RX Multicast frames: 0 RX Fragments: 0 RX Unicast octets: 0 RX Multicast octets: 0 RX FCS errors: 0 RX Discards no buffer: 0 TX Discards wrong SA: 0 RX Discards WEP undecr: 0 RX Msg in msg fragments: 0 RX Msg in Bad msg fragments: 0
SET NW CERTCN	Sets EAP Common Name The default value is null. Sample output: SET NW CERTCN <name> User defined
SH NW CERTCN	Shows the value of first common name check string The default is null (blank) string. The deprecated command SH NW TTCN also returns this information. Sample output: Common name 1
SET NW CERTCN2	Sets second EAP Common Name Sample output: SET NW CERTCN2 <name> User defined
SH NW CERTCN2	Shows the value of the second common name check string The default is null (blank) string. Sample output: Common name 2

Command	Description

SET NW CERTEXP	Sets EAP Certificate Exponent value
	The default value is 10001 Hex.
	Sample output:
	`SET NW CERTEXP <exponent>`
	`User defined`

SH NW CERTEXP	Shows the value of the certificate exponent The deprecated command SH NW TTEXP also returns this value Sample output: `65537 (10001h)`
SET NW CERTKEY	Sets EAP root key Sample output: `SET NW CERTKEY <key value>`
SET NW ID	Sets authentication User ID This can include the realm separated by @. The default value is anonymous. Sample output: `SET NW ID <user id>`
SH NW ID	Shows the value of the authentication ID, including realm, if applicable The default realm is a null (blank) string. The deprecated command SH NW TTID also returns this data. Sample output: `anonymous@somewhere`
SET NW PW	Sets the password for the 802.1x EAP authentication, if enabled The default value is anonymous. Sample output: `SET NW PW <password>`
SET NW INAP	Sets EAP inner-authentication protocol The default value is PAP. Sample output: `SET NW INAP [PAP|MSCHAP_V2]`
SH NW INAP	Shows the inner authentication mode The deprecated command SH NW TTAP also returns this data. Sample output: `Authentication protocol = PAP`
SET NW REALM	Sets the realm portion of the 802.1x EAP authentication ID This value can also be set with the ID command. The default value is null.

Command	Description
	Sample output: `SET NW REALM <realm>`
SH NW REALM	Shows the realm associated with the authentication ID, if applicable. The default value is null (blank) string. The deprecated command SH NW TTRE also returns this data. Sample output: `somewhere`
SET NW WPAGROUPSH NW WPAAUTO	Enable or disable WPA group key mode. If enabled, group keys can be used for data link encryption. The default value is disabled. Sample output: SET NW WPAGROUP [ENABLE | DISABLE]Shows state of WPA auto connect flag Sample output: `WPA-AUTO Enabled`
SH NW WPAGROUPSET NW WPAGROUP	Shows state of the allow WPA group keys flag Sample output: WPA-GROUP DisabledEnable or disable WPA group key mode. If enabled, group keys can be used for data link encryption. The default value is disabled. Sample output: `SET NW WPAGROUP [ENABLE | DISABLE]`
SET NW WPAPSKSH NW WPAGROUP	Sets WPA PSK pass phrase or hex key. This value is only used if the authentication mode is WPA-PSK. The argument to this command is either a pass phrase of 8 to 63 characters or exactly 64 hex characters representing the 256 bit PSK value. Sample output: SET NW WPAPSK <key>Shows state of the allow WPA group keys flag Sample output: `WPA-GROUP Disabled`
SET NW WPATRACESET NW WPAPSK	Sets WPA trace level. This command is for diagnostic purposes only. The default value is 0 or disabled. Sample output: SET NW WPATRACE nnSets WPA PSK pass phrase or hex key. This value is only used if the authentication mode is WPA-PSK. The argument to this command is either a pass phrase of 8 to 63 characters or exactly 64 hex characters representing the 256 bit PSK value. Sample output: `SET NW WPAPSK <key>`

Command	Description
SET NW WPATRACE	Sets WPA trace level. This command is for diagnostic purposes only. The default value is 0 or disabled. Sample output: `SET NW WPATRACE nn`

Port Commands

Table 40 Port Commands

Command	Description

SH PORT	Shows port parameters
	Sample output:
	`Port Q-Size Type Attributes`
	`*S1 0 serial 115200 N 8 1 XON/XOFF RS232`

SET PORT	Sets port parameters. The commands are dependent on the port type.
CLEAR PORT S1 JOB	Aborts the active job on the port. If the remote host is connected, additional data received will be discarded. Sample output: `CL PORT S1 JOB`
SET PORT S1 FLOW	Sets serial port flow control to NONE, XON/XOFF, CTS, or DSR The default value is none. Sample output: `SET PORT S1 FLOW <flow>`
SET PORT S1 PARITY	Sets serial port parity to NONE, EVEN, ODD, MARK, or SPACE The default value is none. Sample output: `SET PORT S1 Parity <parity>`
SET PORT S1 SIZE	Sets data bits on the serial port The default value is 8. Sample output: `SET PORT S1 Signal [7 | 8]`
SET PORT S1 SPeed	Sets serial port baud rate. Options for BAUD are 300, 600, 1200, 2400, 7200, 9600, 19200, 38400, 57600, 115200, 230400, and 460800 The default value is 115200.

Command	Description
	Sample output: `SET PORT S1 SPEED <baudrate>`
SET PORT S1 STOP	Sets serial port stop bits per character The default value is 1. Sample output: `SET PORT S1 STOP [1 | 2]`

Server Information Commands

Table 41 Server Information Commands

Command	Description	Sample Output
SET SERVEr DEscription	Sets server description string Sample output: `SET SERVEr DEscription <description-string>`	
SET SERVEr NAme	Sets server node name The default value is TWC_xxxxxx, where xxxxxx are the last 6 hex digits of the MAC address. Sample output: `SET SERVEr NAme <name>`	
SET SNMP GETCOMM	Gets community name The default value is public. Sample output: `SET SNMP GETCOMM <string>`	
SET SNMP JETADmin	Enables or disables JetAdmin compatibility The default value is enabled. Sample output: `SET SNMP JETADmin [ ENable | DIsable]`	
SET SNMP SETCOMM1	Sets community 1 name The default value is internal? Sample output: `SET SNMP SETCOMM1 <string>`	
SET SNMP SETCOMM2	Sets community 2 name The default value is Pass. Sample output: `SET SNMP SETCOMM2 <string>`	
SET SNMP CONtact	Sets system contact string The default value is null. Sample output: `SET SNMP CONtact <string>`	

Command	Description	Sample Output
SET SNMP LOCation	Sets system location string The default value is null. Sample output: `SET SNMP LOCation <string>`	
SH SERIAL	Displays serial number of the unit Sample output: `Serial number is 9047595`	

SH SERVEr	Shows server parameters
	Sample output:
	`Serial Server Serial # 9047595`
	`Address: 00-40-17-8A-0E-2B  Name: TWC_8A0E2B Number: 0`
	`Identification:  Network Server`
	`Enabled Characteristics:`
	`Link DOWN`	

SH SERVEr CO	Shows server network statistics
	Sample output:
	`Seconds Since Zeroed: 163`
	`Bytes Received:72950`
	`Bytes Sent:18726`
	`Frames Received:752`
	`Frames Sent: 181`
	`Multicast Bytes Rcv'd:64474`
	`Multicast Bytes Sent: 2406`
	`Multicast Frames Rcv'd:626`
	`Multicast Frames Sent:11`
	`Frames Sent, Deferred:2014`
		`Frames Sent,1 Collision: 26`
		`Frames Sent, 2+Collision: 5`
		`Send Failures: 0`
		`Send Failure Reasons: 0`
		`Receive Failures:  503`
		`Receive Failure Reasons: 1`
		`Unrecognized Destination: 0`
		`Data Overrun: 0`
		`User Buffer Unavailable:0`
		`System Buffer Unavailable:1`

SH SNMP	Shows state of SNMP protocol enable Sample output: `SNMP is Enabled`	

SH VErsion	Shows firmware version of print server
	Protocols supported: NetBIOS SNMP TCP/IP EMail DHCP
	Sample output:
	`serial server`
	`Firmware Ver. 4.19 (2004.10.31)`
	`Boot Ver. 1.4`
	`16Mbit Flash`	

Command	Description	Sample Output
Zero	Clears and resets the network statistic counters	

Service Commands

Table 42 Service Commands

Command	Description
SET SERVI <service name> BOT	Sets beginning of transmission (BOT) string index for service The default value is 1. Sample output: `SET SERVI <service name> BOT nn`
SET SERVI <service name> EOT	Sets end of transmission (EOT) string index for service The default value is 1. Sample output: `SET SERVI <service name> EOT nn`
SH SERVI STRings [*string_num*]	Defines the BOT and EOT strings used in services If *string_num* is provided, then the specific string definition and expansion display. If *string_num* is not provided, then all string definitions display without their expansions. Sample output: `10: \FF\04\FF\05\FF\06\FF\08`
SET SERVI <service name> FIlter	Sets filter index for service Sample output: `SET SERVI <service name> FIlter nn`
SH SERVI FILters	Shows filter settings Sample output: **# Service Name Filter** 1 TWC_FFFFFF 0: No Filter 2 BINARY_P1 0: No Filter 3 TEXT_P1 1: Text Substitution m= LF, r= CRLF 4 TWC_FFFFFF_P1_4 0: No Filter 5 TWC_FFFFFF_P1_5 0: No Filter 6 TWC_FFFFFF_P1_AT 4: PostScript Tagged Binary
SET SERVI <service name> FMS	Sets filter 1 text replacement match string index. If the index is zero, the default string of <LF> (line feed) is used. The default value is 0.

Command	Description
	Sample output: `SET SERVI <service name> FRM nn`
SET SERVI <service name> FRS	Sets filter 1 text replacement replace string index. If the index is zero, the default string of <CRLF> (carriage return-line feed) is used. The default value is 0. Sample output: `SET SERVI <service name> FRS nn`
SET SERVI <service name> IP	Enables or disables IP based jobs such as lpd, raw tcp and ftp, on the service The default value is enabled for service 1 and 2, disabled for all others. Sample output: `SET SERVI <service name> IP [ENable | DIsable]`
SET SERVI <service name> NAme	Changes service name The default value varies by service Sample output: `SET SERVI <service name> NAme <newname>`
SET SERVI <service name> POrt	Sets output port associated with a service The default value is S1. Sample output: `SET SERVI <service name> POrt <portname>`
SET SERVI <service name> PRIority	Sets priority for service for multiple service transmissions simultaneously The default value is 10. Sample output: `SET SERVI <service name> PRIority nn`
SH SERVI PRI [*service_num*]	Shows priority of service. If *service_num* is not provided, the priority of all services is listed.
SET SERVI <service name> RECeive	Sets receive only mode for a service This option is required only for host applications that do not operate properly if data is received from the serial device. The default value is disabled. Sample output: `SET SERVI <service name> RECeive [ENable | DIsable]`
SET SERVI <service name> TCP	Sets raw TCP port for service If port number is 0, raw TCP is disabled on service. The default value is 9100 for service 1, 3001 for service 2. Sample output: `SET SERVI <service name> TCP nn`
SH SERVI SUMmary	Shows the basic parameters for a specific service. If *service*_num is not

Command	Description
[*service_num*]	provided, parameters for all services are displayed. The command SH SERVI displays the same data as SHOW SERVI SUM.

String Commands

Table 43 String Commands

Command	Description
SET STRing	Set service string table entry String 1 to11 cannot be set or changed. Sample output: `SET STRing <string #> ”value”`
CL STRing	Clears the service string table entry Sample output: `CL STRing <string #>`

SH STRing [*string_num*]	Defines the BOT and EOT strings used in services
	If *string_num* is provided, then the specific string definition and expansion are displayed. If *string_num* is not provided, then all string definitions are displayed without their expansions.
	Sample output:
	`1:`
	`2: \1BE`
	`3: \04`
	`4: \1B%-12345X`
	`5: @PJL`
	`6: ENTER LANGUAGE=`
	`7: PCL\0A`
	`8: POSTSCRIPT\0A`
	`9: \FF\04\FF\05\FF\06\FF\07`
	`10: \FF\04\FF\05\FF\06\FF\08`
	`11: \0C`

SH FILters	Shows the filters that can modify a job stream
	Sample output:
	`#  Filter`
	`0  No Filter`
	`1  Text Substitution`
	`2  AppleTalk`

Command	Description
	3 Text to PostScript 4 PostScript Tagged Binary 5 DC1 Special

TCP/IP Commands

Table 44 TCP/IP Commands

Command	Description
SET IP ACcess	Allows or prevents access to a block of remote addresses The default value is empty list. Sample output: `SET IP ACcess [EN | DI | ALL] aa.bb.cc.dd {MAsk ee.ff.gg.hh]`
SET IP RANge	Allows or prevents access to a range of remote addresses The default value is empty list. Sample output: `SET IP RANge [EN | DI | ALL] aa.bb.cc.dd {MAx ee.ff.gg.hh]`
SH IP ACcess	Displays current access list settings Sample output: `All hosts permitted access`
SET IP ADdress	Sets server IP address The default value is 192.0.0.192 Sample output: `SET IP ADdress aa.bb.cc.dd`
SET IP ARP ENable	Enables or disables setting of IP address with an ARP packet The default value is Enable. Sample output: `SET ARP [ENable | DIsable]`
SET IP BAnner	Enables or disables printing of job banner on LPD jobs The default value is Disable. Sample output: `SET IP BAnner [ENable | DIsable]`
SET IP CHKSUM	Enables or disables verification of IP checksum on received packets The default value is Enable. Sample output: `SET IP CHKSUM [ENable | DIsable]`
SET IP BOot	Sets number of tries for each enabled IP boot method, if not set to static

Command	Description
	The default value is 3. Sample output: `SET IP BOot n`
SET IP ENable	Enables or disables all IP based protocols The value is Enable. Sample output: `SET IP [ENable | DIsable]`
SET IP FTIme	Sets IP timeout If enabled, the IP timeout is measured in seconds. If disable, the IP timeout is in minutes. The default value is Disable. Sample output: `SET IP FTIme [ENable | DIsable]`
SET IP FTP	Enables or disables FTP protocol The default value is Enable. Sample output: `SET IP FTP [ENable | DIsable]`
SET IP HTTP	Enables or disables HTTP protocol The default value is Enable. Sample output: `SET IP HTTP [ENable | DIsable]`
SET IP KEepalive	Sets interval in minutes for sending TCP keepalive packets on a connection The default value is 5 minutes. Sample output: `SET IP KEepalive n`
SET IP LPD	Enables or disables the LPD protocol The default value is Enable. Sample output: `SET IP LPD [ENable | DIsable]`
SET IP MEthod	Sets method of getting IP address The default value is Auto. Sample output: `SET IP MEthod [ AUTO | BOOTP | RARP | DHCP | STATIC ]`
SET IP PIng	Sends IP ping packets to test connection to remote host Sample output: `SET IP PIng aa.bb.cc.dd`
SET IP PRObe	Enables or disables TCP connection probes The default value is Disable.

Command	Description
	Sample output: `SET IP PRObe [ENable | DIsable]`

SET IP RARp	Enables setting of default router and/or subnet mask based on RARP IP address set
	The default value is 0.
	Sample output:
	`SET IP RARp nn`
	`nn: 0=both 1=no subnet, 2=no router, 3=neither`

SET IP REtry	Enables or disables LPD retry on incomplete job The default value is Disable. Sample output: `SET IP REtry [ENable | DIsable]`
SET IP ROuter	Sets default router address The default value is 0.0.0.0. Sample output: `SET IP ROuter aa.bb.cc.dd`
SET IP SUbnet	Sets IP subnet mask The default value is 0.0.0.0. Sample output: `SET IP SUbnet aa.bb.cc.dd`
SET IP TCP	Enables or disables the raw TCP 9100 protocol The default value is Enable. Sample output: `SET IP TCP [ENable | DIsable]`
SET IP TELnet	Enables or disables Telnet protocol The default value is Enable. Sample output: `SET IP TELnet [ENable | DIsable]`
SET IP TFTP	Enables or disables TFTP protocol The default value is Enable. Sample output: `SET IP TFTP [ENable | DIsable ]`
SET IP TImeout	Sets TCP inactivity timeout. If fast timeout is enabled, the timeout is calculated as seconds. If fast timeout is disabled, the timeout is calculated as minutes. The default value is 1 minute. Sample output:

Command	Description
	SET IP TImeout n
SET IP WIndow	Sets TCP maximum window size in bytes The default value is 10240. Sample output: SET IP WIndow nn
SH IP	Shows TCP/IP related parameters The default value is Sample output: IP is enabled IP address 192.0.0.192 Boot tries 3 Subnet mask 0.0.0.0 Boot method AUTO IP Gateway 0.0.0.0 Max window 10240 (set manually) LPD banner disabled Timeout 1 min LPD retries are disabled Keepalive 5 min **Service Port TCP port** xxxxxx_S1_A S1 9100 xxxxxx_S1_B S1 3001

Power Configuration Commands

Table 45 Power Configuration

Command	Description
SET POWER LEVEL n	Sets the power save mode. High power is for fastest throughput, low power is for lowest power consumption. Set POWER LEVEL 0, 1 or 2 0 = High Power 1 = Medium Power 2 = Low Power

Firmware Update

Table 46 Firmware Update

Command	Description
SET LOAd ENable	Sets the firmware to perform a soft reset and enter the server boot program after the next Exit command.

Command	Description
	This command is used for diagnostic purposes only. The default value is Disable. Sample output: `SET LOAd (ENable | DIsable ]`
SET LOAd HOst	Sets the node name of the Netware boot host. This command is used for diagnostic purposes only. The default value is null>\ Sample output: `SET LOAd HOst <name>`
SET LOAd IP	Sets source computer IP address for TFTP get operation. The default value is 0.0.0.0. Sample output: `SET LOAd IP aa.bb.cc.dd`
SET LOAd SOftware	Sets filename on host for TFTP get update Sample output: `SET LOAd SOftware <filename>`
SET LOAd TFTP	Initiates firmware update using TFTP get operation. The TFTP server address must be set using SET LOAd IP and the filename using SET LOAd SOftware. The server will reset after the firmware update is completed. Sample output: `SET LOAd TFTP`
SET LOAd XModem	Initiates firmware update using the XModem protocol on the serial console The server will reset after the firmware update is completed. Sample output: `SET LOAd XModem`

SH LOAd	Shows the firmware update parameters
	Sample output:
	`Firmware load is disabled`
	`Load Host IP = 0.0.0.0`
	`Software file = xxxx.bin`
	`Load Host Name =`

Miscellaneous Commands

Table 47 Miscellaneous Commands

Command	Description
SET DEFAULT	Set parameters to factory defaults
EXIT	This command exits the current configuration console session.
SH FATal	Shows fatal error log, if fatal errors exist.
CL FATal	Clears the fatal error log
INIT	Instructs the server to execute a soft reset when the next exit command is executed.
SET PAssword	Sets the server access (read) password
SET POWERON	Sets Power on delay
SH POWERON	Displays Power on delay in seconds
SET PROTect	Sets update password to the string given.
CL PROTect	Sets update password to <null>.
SAVE	Saves the current configuration to non-volatile memory. Without this command, the configuration is not saved unless an EXIT command is performed.
SH TEst	Sends the configuration data via ASCII to the serial port
UNPROTECT	If an update password has been defined (SET PROTECT), this command enters the password to allow configuration items to be modified. After entering this command, the server will prompt for the update password. If entered properly, the user will then be able to execute SET commands to modify the server configuration. This lasts only until the console session is terminated with an EXIT command.

Help Commands

For help, simply enter HELP preceding the command. The correct syntax and a brief description of the commands will display.

For example, when inquiring for various commands to display specific IP parameters, type HELP SHOW IP.or for commands to change specific wireless/network security parameters, type HELP SET NWRK.

Appendix B:
Engineering Drawings

Antenna Cable Assembly

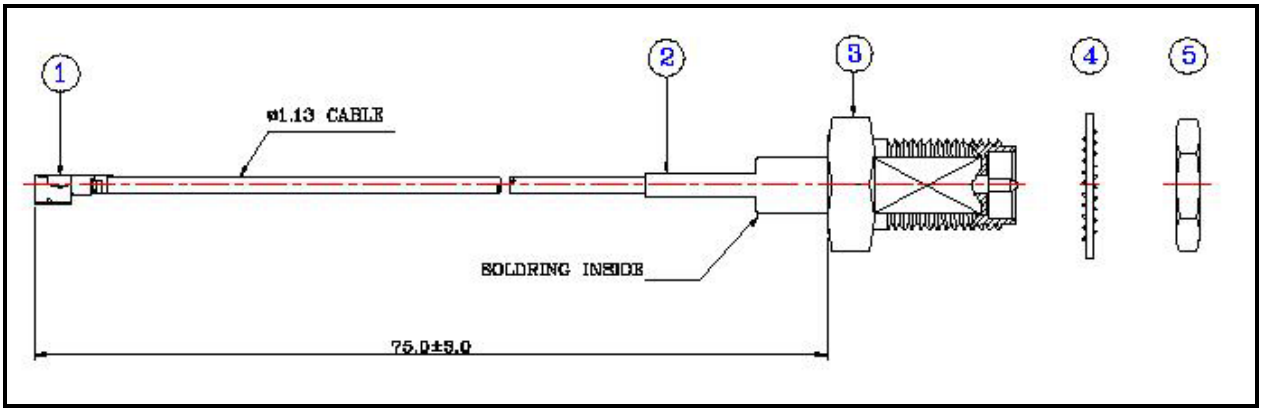


Figure 24 Antenna Cable Assembly

Table 48 Electrical Performance

Parameter	Value
Impedance	50 ohms
Frequency Range	0 to 5 GHz
Working Voltage	6O VAC maximum
Dielectric Withstanding Voltage	20 DVAC maximum
Insulator Resistance	500 megohms minimum

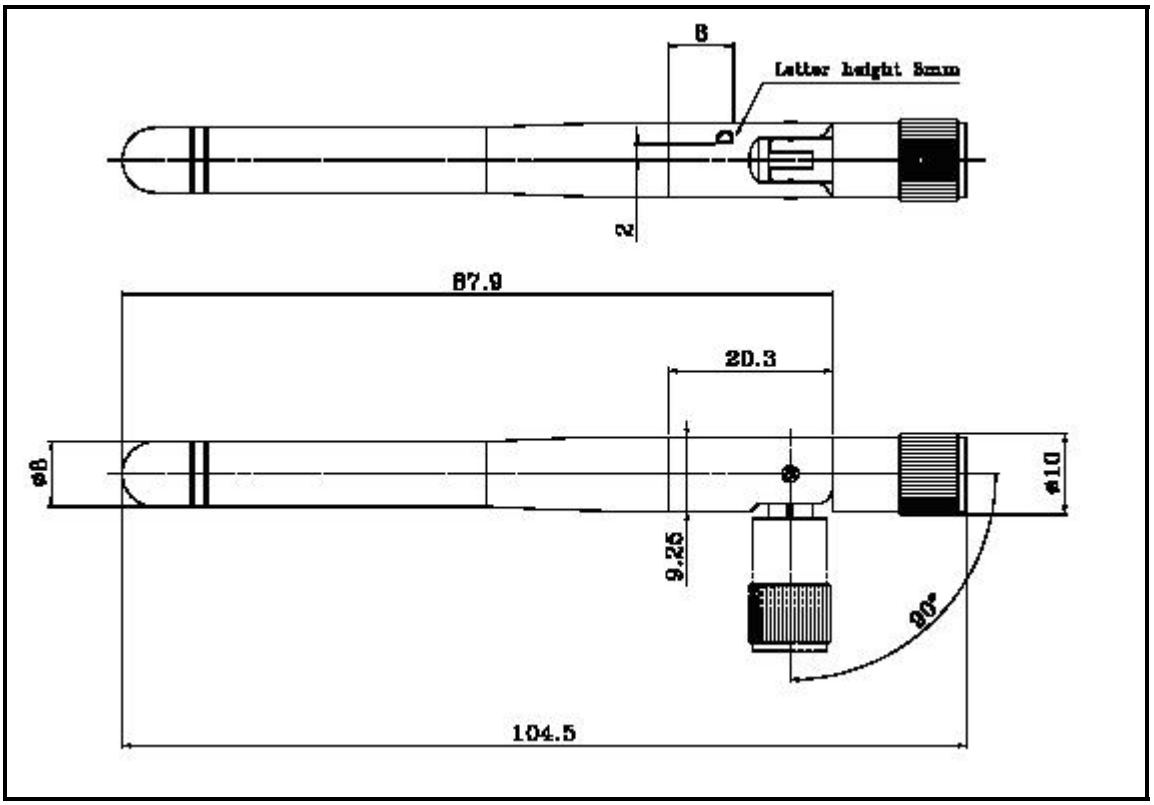


Figure 25 Electrical Specifications for Antenna

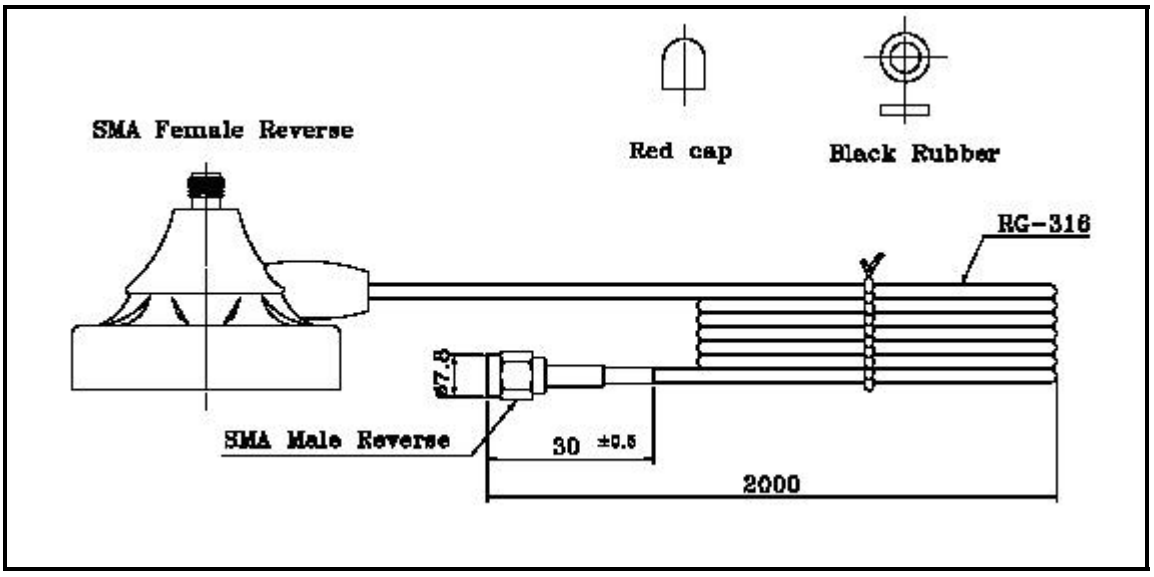


Figure 26 Connector Specifications

Table 49 Electrical Specifications

Parameter	Value
Antenna Type	Dipole Swivel Antenna
Frequency Range	2.4 to 5.8 GHz
Impedance	50 Ohms
Gain	2.4 GHz < 2.0 dBi 5.8 GHz < 0 dBi
VSWR	≤ 2.0
Admitted Power Radiation	Omni
Polarization	Vertical
Electrical Length	¼ n Dipole
Standard Connector	SMA — male reverse

silex technology america, Inc.
www.silexamerica.com

Part Number 40183-101